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NEWS IN BRIEF

Software for micros

THE first real time executive software to be developed by a microcomputer manufacturer for resident use on a micro has been released by Intel. Known as RMX/80, it runs on Intel's 8080-based configurations.

It is based on a modular, 2K byte block of code known as the Memory Resident Nucleus and a number of utility routines such as console and analogue I/O drivers, and drivers for the hardware mathematics board, diskette controllers and the like.

European links

DEMAND from Holland and Belgium for UK computer staff has led the staff recruitment firm John Goldsmith Computer Services to forge closer links through working agreements with local companies. John Goldsmith's contact in Holland is a software and staffing company, Computer Service Evers. A link with Belgium is now being arranged.

Koreans accused

A RETIRED US lieutenant-colonel has accused top South Korean officials of stealing up to $17 million worth of US supplies a year since the early 1970s with the help of the US Army's Univac computer in Taegu.

FPS moves in

ARRAY processor manufacturer Floating Point Systems, of Portland, Oregon, has opened offices in Reading and Geneva to market its systems in Europe. FPS products include the AP-120B which can interface with minicomputers and the AP-190L for use with mainframes.

GE to enter packet switching business

THE International time sharing bureau General Electric is planning to become a common carrier offering packet switched network services. It is understood that the US company is already preparing tariffs for submission to the government's Communications Commission.

US observers note that, as the biggest time sharing network in the US, GE could enter the packet switching business with minimal investment. But they add that the company is likely to meet opposition from other carriers, such as Telenet, who could argue that GE is already too big and that it is not necessary for the government to licence another carrier.

GE is said to be convinced that its existing time sharing customers would be interested in the cost savings and reliability of a common carrier's network, and the company itself would probably be a major user.

No one at GE was available for comment as Computer Weekly went to press, and Honeywell, which markets GE's Mark III time sharing network in Europe, said it had heard nothing of GE's plans.

Now Honeywell unbundles operating system

RELEASE of an enhanced transaction processing executive in the US shows Honeywell following the lead of IBM in unbundling software on the fringe of its operating system.

The existing transaction executive, which will continue to be supported, is regarded as part of the GCOS operating system, and supplied free of charge. The new software, Transaction Processing Executive-2, will be marketed as a separate, charged product.

The situation is radically different from that of IBM's charged performance and security enhancements to its MVS and VM/370 operating systems, in that Transaction Processing Executive-2 was not produced within Honeywell. It comes from Information Systems Consultants, of Virginia, and was originally developed for the International Brotherhood of Teamsters, the largest US trade union.

Honeywell pays a licence fee for the software to ISC, before re-licensing it to users. It is thus faced with a continuing cost, rather than merely paying off the cost of a development.

UK release of the software is not yet scheduled, but in the US it will be available within the next three months for a $35,000 single payment with an annual $1,750 maintenance charge after the first year.

Transaction Processing Executive-2 is supplied for Level 66 and 6000 machines, and is claimed to be up to 50% more efficient than the existing GCOS software, as well as allowing greater user interaction with the system at run-time and providing more comprehensive statistics.

The Honeywell move also highlights a growing trend among hardware manufacturers to acquire critical items of software from outside sources. Honeywell already provides Cincom's Total database management system as a standard product.

Klatu arrives at Heathrow — as a passenger.

Klatu the robot comes to town...

KLATU came to town last week and if all that is claimed for it (sorry, him, according to his maker), then the age of the robot has arrived.

Produced by Quasar Industries of New Jersey, Klatu flew by British Airways into Heathrow on a transatlantic trip sponsored by the Daily Mail.

The robot is based on a microcomputer, the Q16, which is Quasar's own design. The company has been in the SPA — Sales Promotion Android — field for 10 years and hopes to have a robot at the Ideal Home Exhibition at Olympia next March.

Commented Ray Pay, head of the NPL's speech recognition group, "If it can do what it is claimed, it is using technology of which we have no knowledge." And Dr Michael Larcombe, of Warwick University and secretary of the recently-founded British Robot Association (CW, July 28), expressed surprise that such an intelligent machine should cost only about $4,000.

Klatu, which is said to speak, accept spoken orders and carry out "functions programmed by the owner", has a vocabulary of 4,800 words and has a phoneme recognition factor of 1,200.

Phonemes are variations of the sounds of speech.

A domestic model planned for mass production will have a 250-word vocabulary and a phoneme recognition factor of 50.

Vice-president of Quasar, Tony Reichelt told Computer Weekly that they hoped to be turning out 120 androids a day in a couple of years. Tooling up is now in progress and Reichelt said, "We hope to meet demand in the US and the UK in 22 months."

Bolton choice

KEY-TO-DISC equipment from Redifon Computers has been chosen by Bolton Metropolitan Borough to replace ICL and Univac card punches. The Seecheck system, with 14 terminals, will prepare data for the ICL 1903T run by Bolton and Bury.

Autumn boost for Eclipse

A MORE powerful version of the Data General Eclipse, the Model 500, is expected to be announced by the company in the autumn. It will come with a floating point processor and up to one Megabyte of main memory, and will compete directly with the Digital Equipment PDP-11/70 and the Interdata Megamini.

Holiday air strike vote

ASSISTANT air traffic controllers and teleprinter operators at the West Drayton control centre have voted overwhelmingly to strike from today (August 25) until Monday in support of their pay demand of up to 17%.

They had previously refused to provide input for the IBM 9020D air traffic control system from which flight progress data is produced.

During the go-slow, handwritten flight progress strips have been used.

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ICL offers productivity deal to 8,000 staff

AGREEMENT in principle has been reached between ICL and five unions over a self-financing productivity scheme, following a meeting last week.

According to ICL managing director Geoffrey Cross, the agreement is "well within the government's guidelines on pay" as it consists essentially of a five per cent Phase Two offer plus a self-financing productivity scheme which could amount to between 12 per cent and [illegible] per cent over 14 months depending on company turnover.

The offer includes bonus payments of one per cent for each one per cent increase in turnover, above the first 10 per cent increase in turnover, provided that profits are at least £25m a year after payment of bonus.

Pre-tax profits in 1976 were about £23 million, compared with £16 million in 1975.

The offer is being looked on favourably by the unions involved. These are ASTMS, the EETPU, the TGWU, APEX and TASS.

They have recommended acceptance of the offer by the 8,000 ICL workers whose pay is reviewed each June.

Meetings are being held and the offer is almost certain to be accepted.

Pilot PoS

POINT-OF-SALE equipment from ICL has been installed in a cash-and-carry depot in Worcester as a pilot system by Warriner and Mason, a wholesale distribution division of tobacco giant Gallaher. The system, comprising five [illegible] point-of-sale terminals and two 1501/40 computers, could be the first of several orders. Warriner and Mason has depots around the country.

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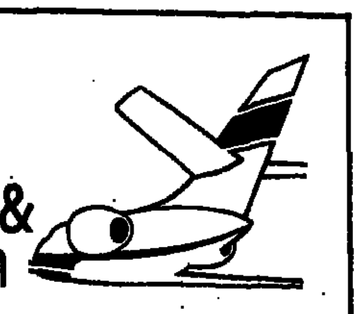

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Briefing

Array for 1100 series

FOR high speed mathematical and scientific computation on 1100 series mainframes Univac now offers a floating point array processor. This is the AP-190L manufactured in the US by Floating Point Systems Inc of Portland, Oregon, the firm that has just opened sales offices at Reading and Geneva (CW, August 25).

The AP-190L can operate via one I/O channel pair from the host central processor and Univac says that conversion from its 36-bit format to the 38-bit format of the AP-190L is handled by the 1100's channel interface. Application areas for the array processor include seismic and weather modelling, image processing, structural analysis and simulation.

Harris prices cut

IN response to the IBM 3270 price reductions of about 16% announced earlier this year (CW, May 26), Harris Systems, formerly Sanders Data Systems, has lowered the prices of its 8170 and 8180 interactive display terminals systems to between 10% and 22% below IBM. Harris says that a three-year lease agreement on an 8170 system, for example, is now 20% less than the equivalent 3270 installation.

NCR strike

PRODUCTION of terminal equipment at NCR's Miamisburg, Ohio, plant has been hit by a strike of more than 800 production and service workers, but senior staff are continuing production of the microcircuits which are used in NCR's terminal range.

L9000s go North

TO handle details of rent and rates collection, payroll, costing and creditors ledger, the Western Isles Council at Stornaway on Lewis, has installed two Burroughs L 9000 systems at a cost of £25,000.

Fujitsu chips

ADDITIONS to the Fujitsu range of microcomputers has made the company second only to Nippon Electric in Japanese microcomputing capabilities. Fujitsu has introduced a single chip, 4-bit micro and a two chip, 8-bit system, the latter being compatible with the Motorola MC6802 device. These additions are expected to double Fujitsu's microcomputer output.

FTL 6 at Computel

THE FTL6 programming language, developed by the NCC from its Filetab file maintenance software, is now available from Computel on its ICL 1904S. The bureau is also examining the unreleased 2900 implementation of the language for use on its pair of 2960s.

Triad in Guildford

A NEW office has been opened by software house Triad Computing Systems, in Guildford, Surrey. Headed by Dr Keith McKenzie, it will help service existing clients in the area, as well as seeking new business.

Visit by Hong Kong expert

A HONG KONG expert on the use of computers for translating Chinese texts into English is to address a joint meeting of the British Computer Society's natural language translation specialist group and the Association for Literary and Linguistic Computing.

The speaker will be Shiu-Chang Loh, professor of computer science at the Chinese University of Hong Kong. He is visiting the UK to look at a number of computers in use, as his department is expanding and needs its own machine.

Professor Loh said the department was set up three years ago, but is only starting to offer a degree course in the coming academic year. He is seeing Digital Equipment, Data General and GEC minicomputers in action during his visit.

Professor Loh will talk on the computer translation of Chinese scientific journals. The meeting will be held on September 13 at 6pm at King's College in The Strand, London WC2. Non-members will be welcome.

Software on TV with Oracle

SOFTWARE could be sent into the home for use with do-it-yourself computers by means of the Oracle teletext service which Independent Television is planning to introduce on October 1. The memory in the Oracle signal decoder would act as a random access memory for the user's in-home system.

An IBA team is working on this possibility, which was suggested by Will Overington and described by him in a letter to Computer Weekly (CW, September 30, 1976).

"It's an interesting idea and has some very exciting possibilities," said John Hedger, part of the team evaluating Telesoftware, as it is called. "It could be a way of linking teletext with the booming home computing market."

Hedger said the software would be transmitted as teletext characters, loaded into the decoder memory at the television receiver and accessed by a microcomputer linked to the decoder.

The plans of one of the three companies aiming to join Texas Instruments in the market for Teletext and Viewdata decoders are particularly significant in the context of Telesoftware.

The company, General Instrument Microelectronics has adopted a radically different approach from TI, GEC and Mullard. It is using the GIM PIC 1650 eight-bit microcomputer in place of specially-designed chips. GIM is developing the two interface chips for this application and samples of these are awaited from the company's laboratory. The decoder is expected to be announced some time next year.

Later GIM hopes to be able to upgrade the decoder by use of the CP 1600 16-bit micro, which would enable other applications to be handled. GIM also believes that the use of a micro will make its decoder cheaper than those of its rivals.

The introduction of Telesoftware as a service will depend on co-operation from microcomputer manufacturers, on the Home Office agreeing to the service, and on whether the Independent Broadcasting Authority considered it a viable proposition.

Telesoftware will not be ready for October 1, when the Oracle service goes live. Oracle will be run between 9.30 am and 10.30 pm seven days a week. Initially 250 pages of information, including home and international news, sport news, financial news and such items as recipes, will be available.

The Oracle board expects to expand the service to about 350 pages when access time problems have been cured. Delays are caused by the fact that the cycle of pages is scanned when a page is chosen, so there can be a long wait if the selected page has just passed when the user chooses it.

The Oracle team hopes to cure the problems by repeating the more popular pages, such as the indexes, in the cycle, and by using blank space in the TV signal.

As for demand for the service, television manufacturers estimate that 12,000 sets will be receiving Oracle by the end of the year, 62,000 in 1978 and 270,000 by 1979.

● Three reports, Teletext and Viewdata, Homecomputer, and Video Games, are available from Mackintosh Consultants, Victoria House, Victoria Street, Luton LU1 5DH. They cost £430, £550 and £490 respectively.

West German PTT buys rights in Viewdata

THE British lead in the use of the domestic television set for the display of textual information is emphasised by the fact that, after three months of trials with a GEC 4080 minicomputer (CW, June 9), the West German PTT authority has decided to buy rights in the Post Office's Viewdata software and expertise.

Viewdata links the television set via the telephone system to a remote computer, to provide access to a remote computer, to provide access to a theoretically unlimited amount of data. Viewdata was demonstrated at the International Radio and TV Show in Berlin last month.

Enhancements to Series 1 expected from IBM soon

THE release date for IBM's real time operating system for the Series 1 (CW, April 21) has been brought forward, say US sources. The software could now appear within the next month in the US. The UK will presumably receive the operating system in October.

Some prospective users in the US have already seen the operating system, and report that it suffers from the usual IBM drawback of large core occupancy. Addressability of core by the operating system is also reported to be limited, meaning that users will not be able to utilise the machine's full 128 Kbyte capacity.

No configuration of likely release date could be obtained from IBM in the UK.

● The disc capacity of Series 1 systems is expected to be boosted early next year with the introduction of an 80 Megabyte subsystem based on Winchester type technology. The Model 4962 drive currently available for use with the Series 1 has a capacity of 9.3 Megabytes.

DG expands

BECAUSE of high taxation in its home state of Massachusetts, Data General is to expand its plant at Westbrook, Maine, where processors and peripherals are assembled. When its other new plant at Clayton, North Carolina, is completed (CW, October 28, 1976), and both are in operation early next year, Data General will be employing a further 1,300 people.

CW from strength to strength

FOR more than 11 years, Computer Weekly has consistently provided the most comprehensive and reliable reports on the computer industry. At the same time, it has been a pioneer in developing specialist columns where readers can express their opinions and learn about developments in their areas.

CW has been in innovator in introducing regular features for the software industry (Software File); for programmers (Programmer Notes); for users (User Forum) and universities (University Round).

Now Computer Weekly is going from strength to strength, with its growing band of new contributors such as Professor Donald Michie and Tom Gilb to join George Cogar, Fred Lamond and the experienced CW team.

The £5 interrupt

On page 2 there is a new feature called Interrupt — a true story modern Aesops Fable, each with a moral to be learnt. And £5 will be paid for any published interrupt sent to us.

Othello the More Game

Once you have tried playing Othello you will want to play it more and more. See page 11 for our special offer.

Calculator offer—page 3

COMPUTER WEEKLY'S INSIDE NEWS

Ballantine's Day

The Hedsor Park conference on "Can computers save Britain?" has become a focal point for activities within the computer community to analyse and respond to the challenging issues of how information technology will affect society. Malcolm Ballantine, a lecturer in ergonomics and the effects of computers on work, read Computer Weekly's reports on Hedsor and this week provides his own contribution to the continuing debate. Page 4

Poor old Harpy

Harpy is a speech-understanding research project, which was funded by the US Defence Department's Arpa agency. But it made a cardinal mistake: it met its research objectives and lost Arpa backing. Professor Donald Michie gives his private view on the mysterious machinations of research patrons. Page 6

Liverpool 2 Chad OK

Computer wins football league. That is not merely the fantasy of one of Computer Weekly's football-crazy writers. Downtime's Chad explains why. Page 4

Laser musical

Laser beams and holographic memories could make an important impact on computer memory technology in the future. Steve Shirley reports. Page 13

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COMPUTERVIEW

Users can act now to shape their future

THIS week's Computerview urges as many users and user groups as possible to respond to a call by the EEC for user group names and addresses for their files, and to the DPMA survey on user reaction to the Carter Committee on the Post Office.

User groups should send details to the Commission of the European Communities, DG III/B/2, attention Mr Garric, 200 rue de la Loi, B-1049 Brussels, Belgium.

Users who are not members of the DPMA and who would like to receive copies of the questionnaire should contact the DPMA at 27A York Road, Maidenhead, Berkshire SL6 1SQ. Telephone: 0628 29979.

THE lack of a forceful and unified user voice has been a major industry failure for so long that no opportunity to unite should be missed.

Two recent initiatives should therefore be seized upon by all users — the Data Processing Management Association survey of user opinion on the Post Office (CW, August 4) and the EEC call for user groups to ensure that their names and addresses are on the EEC's files to assist in proper consultation in the future (CW, August 25).

Within the next weeks many users will be receiving the DPMA questionnaires which have been drawn up by Langton Information Systems Ltd. as an enlightened response to a request by the Carter review committee on the Post Office to comment on their recent report.

Instead of merely providing a critique by a select group of DPMA representatives, the association has chosen to seek the views of its members and the computer community at large.

By contributing to this survey, it is unlikely that any one user, or even all users together, can have a major immediate impact on Post Office.

But at least the survey will help to pinpoint the DP users needs.

The questions cover a wide range of topics: the use of electronic mail, external databases, Viewdata, and the effects of communications costs.

As the DPMA says in the covering letter, "The questionnaire does not seek basic information which is covered adequately in other surveys, but is aimed at assisting the Post Office to respond to the information systems thinking of DPMA members."

The DPMA would, however, like to receive the views of as many users as possible, whether or not they are DPMA members.

The EEC request for user groups' names and addresses is particularly significant because it is aimed at laying the foundation for bringing about the creation of a united European user voice.

The Commission is determined to ensure that the user voice is heard more in the development of strategies relating to the computer industry and would like to see a single, united user body.

There are major hurdles to be overcome before such a body can be set up. And the prime one is that users, like most people, tend to be concerned with their own immediate self-interest problems.

That is why most user groups are manufacturers-based and are aimed primarily at parochial (albeit important) manufacturers - dependent problems.

It is difficult to get a user to take action over an apparently nebulous issue like electronic mail or international data flows, when so much time is spent on trying to get any kind of smooth data flow.

But unless the DP user takes some unified action soon, decisions could be made by government, manufacturers or user departments that *will* affect them.

Filling in the DPMA or contacting the EEC are two simple ways of users taking up the opportunity to get involved in the decision-making process. Further action should follow and one looks, in particular, with some hope to the EEC's call for user consultation.

This concept should also be strengthened by broadening the view of what is meant by user. In terms of this Computerview, so far, "user" has been taken to mean the DP department. But there are other users, known variously as the end user, the user department, or, as was horribly coined at IFIP last month, the "usee."

With the advent of minis and micros, the end user is increasingly becoming a direct computer user. And, after all, the computer system is there to meet the end-user's needs ultimately.

It is perhaps too premature to start asking for a united end user voice, when it is so difficult to get even the DP users together.

But in any discussion about users and user power, nobody should ever forget that the real power ultimately lies outside the computer department.

Ten years ago...

COMPUTER WEEKLY, AUGUST 31, 1967

THE English Electric... merger brought "rationalisation" at the lower end of the range and the withdrawal of System 4/10 without it being officially announced... E3000 family was added to the Burroughs range, beginning with the smallest, E3200, the largest, E3500... announced the P203, a version of the Programma desktop computer... 10-year scheme to computerise PAYE records for 20 million taxpayers got under way... Inland Revenue Staff ... tion forecast ... computer centres were ... in "unattractive development areas"... The first ... plotting available through commercial time sharing ... was provided by ... Electric... An English Electric 4/70 computer was to take the work done by a complex of four machines, an IBM ... 360/30 and 1401, and ... Mercury, at the UK ... Energy Authority... Concordances to 37 Shakespeare ... were to be produced at ... University Computing ... KDF9 and published by OUP.

INTERRUPT...

THIS week we begin a new series of modern Aesops Fables — true computer tales, cloaked in anonymity to protect the guilty and the innocent, with a moral to be learnt. For any published fable from a reader, Computer Weekly will pay £5. The first few fables have been contributed by Peter Williams, a computer man in the City. And here is his first tale:

ONCE upon a time there was a steel mill which was completely controlled by a minicomputer. All the ingredients for the different types of steel and the output of the mill, were supervised by the computer.

The system, programmed in machine code, worked perfectly until suddenly, in the middle of a night shift, the mill started to produce material which bore no resemblance to that which was required. So the computer support team sat down to debug the machine-code program — all 16K of it. No bug was found.

They were saved from complete despair by the senior programmer, who wandered into the machine room at about 3 am. There he discovered the operators hard at work. And, like all working men needing sustenance, they had been over to the all night canteen and had brought back greasy bacon sandwiches. Which led to grease on the input paper tape, which led to the production of expensive rubbish by the mill.

Grease in, garbage out, you might say. And the moral of this story is: Do not let your operators eat bacon sandwiches (or anything similar) in the machine room. Or you might end up with a load of pig iron — or something else you don't need, like trouble.

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FOCUS

... on the industry's price-cutting war

THE current industry price-cutting rage is gathering momentum. Few weeks seem to go by without details of fresh unrepeatable offers. Last week was no exception, bringing news that "DIY" computing kits were joining the price-cutting club (CW, August 25).

The fact that there was scope for reducing prices in this particular area may well have come as a surprise to DP professionals, many of whom were under the delusion that prices were already minimal.

As for mainframe computers the price-cutting cycle appears to operate in a well structured mode: Following IBM's price-cutting exercise, Telex and Itel lose little time in announcing their lower prices. This operation is quickly followed by news of yet another impending Japanese computer invasion of the US and Europe. Almost inevitably, IBM takes up the challenge and establishes new, lower prices. Telex and Itel meanwhile do not lag far behind in making fresh cuts.

By now the industry should be revelling in the cut-throat competition. DPMs should be evaluating between taking advantage of the current Honeywell offer, or hanging on for a week or so for NCR's latest competitive prices.

Open and above board price incentives are new to the industry. Not so long ago, computer managers rather than the company cash flow were the salesman's target. The DPM in the market for a new machine was encouraged to visit a similar configuration in down-town Hamburg or Amsterdam — and here it wasn't solely the attributes of the machine system which was revealed.

Potential purchasers of perhaps less costly systems would be invited to visit the manufacturing plant. An odd hour or so in the factory, followed by a visit to the Scottish Highlands, worked wonders for the sales graphs. Very often these "away-days" were more than a purchasing fringe benefit. They enabled the installation and sales team to get to know each other — a relationship that could be of critical importance for the future wellbeing of the DP section.

Many DP managers must wonder what the price-cutting excitement is all about. In the past, price-cutting was probably far more flexible. Salesmen had many subtle methods of reducing costs for the purchaser. It was not necessarily the lowest price which offered the best deal. Costings from several manufacturers could be compatible for a proposed new configuration. But it was the after-sales service which was the key to the DPM's final decision.

An offer of a four-man project team to mastermind the conversion routines could well trump the promise of free unlimited testing time or the two-month in-house assignment of a telecomms expert.

Even now, prices are often a great unknown. Salesmen may surreptitiously consult a price guide book, probably to determine how much they can charge in specific circumstances. Manufacturers guard their price structures as zealously as future product developments.

Until fairly recently, price levels were seldom a major influence on the purchase of new equipment. If the equipment met the needs of the company and was reasonably competitive in price, then the contract would be signed. In any case, the price was often disguised with leasing or renting formulas.

With current prices falling almost as fast as minicomputer sales are rising, price levels have a more significant role. Renting a micro system for under £10,000 would hardly justify the monthly charges.

This new found price awareness is to be welcomed if as much scrutiny will be given to the cost of hardware as is expended on cost ... of media. At least, the price-cutting war is one DP installations are guaranteed to win.

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Minister challenged over ESA orders

THE row over the Employment Services Agency orders for US minicomputer equipment (CW, August 11) continues with the news that John Wakeham, the Conservative MP for Maldon, Essex — has written to Employment Secretary Albert Booth about the affair.

This follows the strong attack on the ESA and on the Central Computer Agency by another MP, Eric Moonman (Lab, Basildon) who described the decision to buy US equipment for the job vacancy message switching systems instead of UK-built kit from Digico as "appalling."

Moonman has already been in touch with Booth asking him to intervene.

The Department of Employment has acknowledged receipt of the complaints from both MPs but as yet is unable to comment on the matter.

Wakeham told Computer Weekly that he did not regard the issue as party political and said that he would probably liaise with Moonman as it developed.

He believed that if the matter was not resolved by the time Parliament reconvened at the end of October questions could be asked in the House.

Wakeham has sent Booth a copy of the Computer Weekly story about the ESA orders, together with a letter pointing out that, while he was not an expert on the computer industry, he would be interested in Booth's comments.

So far the Employment Services Agency has ordered two message switching systems for disseminating job vacancy details among Job Centres. These are to be installed in London and Glasgow and, in both cases, the supplier chosen was Interdata. The equipment ordered includes about 100 US built daisy wheel printer terminals.

Digico's unsuccessful tenders included matrix printer terminals manufactured in the UK by Drico and Trend as well as its own Micro 16E minicomputers.

Message switching systems for about 10 more conurbations could be ordered by the ESA — the next two probably being Newcastle and Liverpool. Digico intends to bid for these contracts.

Testing the 'obedience' of average motorist

ONE of the crucial elements in modern traffic control technology is the lack of any direct control over the motorist. Although motorway systems offer the motorist a wide range of instructions through the road signs, there is nothing to compel the motorist to obey.

Now, the Transport and Road Research Laboratory has placed a contract with the Golden River Company of Bicester for microprocessor-based vehicle classification equipment that will be used to study the degree of obedience in the average motorist.

The Golden River system will provide information on vehicle speed, spacing and lane grouping for a 10 km stretch of motorway following a set of illuminated signs. In this way, the pattern of changes in driving habits can be established, and the notice drivers take of the signs ascertained.

Vehicles passing over buried inductive loops in the road can be classified into 24 known and six unknown groupings ranging from private cars up to heavy fixed and articulated lorries. This is carried out by a program developed by Golden River, based on data extracted from manufacturers' literature.

The system is based on the RCA 1802 microprocessor working with 65K of memory constructed in 4K, UV erasable PROM blocks. It is modular in construction, with the processor capable of operating with a variety of monitoring units made by the company.

The processor module costs between £1,500 and £2,000, depending on software, which is equivalent to performing a manual traffic classification for one week.

DEC system to teach Basic and Fortran

A BASIC and Fortran system based on the PDP-11 minicomputer is being introduced to the education market by Digital Equipment. The system, already launched in the US is expected in the UK in the next few weeks.

The system, called MSB-11, is aimed at secondary schools in the US but the main market in the UK will be "technical colleges upwards," according to DEC. The price of about £17,000 includes a 32K PDP-11/40 with two floppy disc drives, a 180 chps matrix printer, a mark sensing card reader, a terminal and Basic and Fortran languages.

The company says the new mark sensing card reader will make the machine especially attractive to colleges which cannot afford card punches.

Another key feature, says the company, is that the user can either run four interactive Basic terminals or run a fast-turnround batch stream with both Basic and Fortran jobs.

Hotel Poster from NCR

INTRODUCED by NCR is the 250-8000 Hotel Poster, which gives front office control over hotel transactions, from advance bookings to gift shop purchases.

It has programmable print positions with two column print, room rate look-up turnover figures for particular departments and a cassette recording capability.

Sharp 'defects' to Amdahl

LATEST "blue chip" IBM customer to defect to Amdahl is the international APL time sharing bureau I.P. Sharp. The Toronto-based bureau at present uses two IBM 360/75s, but in September will install an Amdahl 470V/6.

To start with, it will run alongside the two 360s; but Sharp plans to phase out one of these quite soon.

Sharp has never been a conformist IBM user: in 1975, the company, at that time using two 370/145s, considered enhancing its installation with a Burroughs B6700. In the end it decided to upgrade in reverse and replaced the 145s with the two 360s.

By making the switch to the older machines, Sharp was looking for up to three times better throughput at about the same cost as the 145s (CW, October 2, 1976).

The operating system used by Sharp is based on version 27 of DOS with several in-house enhancements. The Power spooling package, also enhanced in-house, is used.

● The North-east Florida regional data centre in Gainesville has replaced its IBM 370/168 with an Amdahl 470V/6, which is to run under OS/MVT and use the Hasp communications package. The machines will be used for the full range of educational applications by the Universities of Florida and of North Florida.

In the early 1970s, Memorex tried to challenge IBM with a pair of medium scale mainframes aimed at IBM's smaller 370s. That attempt was abandoned, but Memorex is supporting Amdahl by replacing its two 370/155s with a 470V/6.

Other recent Amdahl 470 deliveries were made to the Bell Telephone Company of Pennsylvania, Burlington Northern Railroad and Exxon Corp, which trades under the Esso name in Europe.

First deliveries of the smaller 470V/5 are to begin next month with systems going to two as yet unnamed customers.

Calculator offer

Due to an administrative error the special price for the Texas Instruments TI-Programmer calculator was given incorrectly last week. All orders received in response to that advertisement up to first post Friday, September 2, will be honoured. The calculator is now offered at the special price of £45.36 inclusive of VAT and P&P, which is a saving of £4.59 on the recommended retail price. Readers wishing to take advantage of this offer should complete the coupon below and return it with their cheque or PO to the address shown.

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Please send me .... Texas Instrument TI-Programmer hexadecimal and octal calculator/s at the special Computer Weekly price of £45.36 (inc VAT and P&P). I enclose a Cheque/PO to the value of .... made payable to IPC Business Press Special Offers.

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MEET the ideas man ... Ken Bruce from the production engineering department at Honeywell's Newhouse factory, Strathclyde, is seen seated at a machine he designed for producing pre-formed components for printed circuit assemblies. He has also won a prize for a new method for improving the yield on soldered circuit boards. Bruce's ideas were put forward under the factory's cost improvement programme and were much appreciated by the technical operations manager Tom Frame (centre) and George McNeil, director of Newhouse computer operations.

GEC wins minis order

THE order for minicomputers to replace the 10-year-old IBM mainframe at London's University College has gone to the UK manufacturer GEC. The other companies competing for the order were Prime and Digital Equipment (CW, August 4).

Three GEC 8042 will be delivered during the 1977-78 academic year and another two or three will probably be added later. No configuration details have been worked out yet but the college has said that the processors will be linked.

Extras for Olympia machines

NOW available as optional extras for Olympia Business Machines SGE 65 and SGE 65C typewriters are a decimal tabulator, micro typestyle, Arabic script and a 24 inch carriage.

The ten-key tabulator is said to be a time saver for the typist when it comes to financial/accountancy listings or form filling. It costs £49 plus VAT.

Of interest to those who wish to obtain the maximum amount of typing on a single sheet, the micro type, said to be the first available to the new international standard, gives 15 letters per inch and costs £46 plus VAT.

Reflecting the growth in the export market to the Middle East, Olympia has also introduced Arabic script, while wider jobs can now be handled with a new 24 inch carriage. Respective prices are £72.50 and £221 (on the price of 13 inch model).

Cassette terminal introduced to UK

A MICROPROCESSOR-controlled cassette terminal, manufactured by the MFE Corp of New Hampshire has been introduced into the UK by Data Dynamics.

The MFE 5000 terminal uses the micro to control the cassette transport and implement all commands to the system. In addition to forcing the operator to perform only legal operational sequences, it also implements all the internal self-checking.

Interfacing can be either CCITT V24 or TTY current loop, with communications rate switch selectable to any of six speeds from 110 to 2400 baud. Character length is 11 bits at 110 baud and 10 bits at all other speeds, and transmission can be either half or full duplex using asynchronous serial bit-by-bit characters.

Operator controls are provided for read, write, initialise, fast forward, rewind, auto-program search and edit. In addition there are 13 remote control functions implemented in ASCII control characters.

Intel-Timex watch contract

TIMEX has signed a contract with Intel for the development of a liquid crystal watch.

The contract has prompted speculation in the US that Intel is preparing to withdraw from the finished watch manufacturing business, the province of its Microma subsidiary.

Miniterm 1203 from Teleprinter Equipment

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The ultra-lightweight Miniterm 1203 is computing power in a briefcase. Ideal for programmers or executives, the Miniterm interfaces with all popular timesharing systems and can be used just about anywhere — in the office or out of it. The Miniterm 1203 is at home in any environment. Quiet and unobtrusive, it doesn't take much desk space and is built to take the punishment of daily use.

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DOWNTIME
by Chad

Computer-influenced Liverpool in winning form.

Why 'the Reds' are off to a good start

IF Liverpool wins the Football League championship again this season it might be because the team paid £400,000 for Kenny Dalglish in the summer. Or perhaps because Steve Heighway in particular has reportedly started the season in top form.

But whatever effect individual players have on the team's fortunes, the Football League's computerised fixture selection system is likely to be one of the most important influences.

For it is this system—run by a bureau which prefers to remain anonymous for fear of being flooded with requests for fixture details—which draws up fixtures for the 92 league clubs, in four divisions.

And the system has already helped "the Reds" at Liverpool get off to a good start by giving the team two relatively easy first home games against Newcastle United and West Bromwich Albion, saving likely championship contenders such as Manchester United and Ipswich Town for later.

The Football League started to compile the fixtures by computer about 12 years ago merely to speed up the process, said Alan Hardaker, general secretary.

"Before that they were prepared by a full-time member of the Football League staff and two assistants using a copyright formula. After considerable preparatory work, the actual compilation took about two weeks. The preparatory work still has to be carried out by Football League staff, but the compilation is much quicker."

The preparatory work includes ensuring as far as possible that teams playing away at Christmas and Easter do not have to travel too far. Each team can name one other team it does not want to clash with on home games, and this too is taken into account at the input preparation stage.

The League also tries to ensure that fixtures are not played in the same order as the year before.

The computer system produces individual club fixture lists and a chronological list of all fixtures. The lists are sent to clubs for comments and requests for changes are made where possible.

The preparation of data for a season's fixtures starts in the previous March or April. The fixtures have to be ready well in advance so that clubs and other organisations can prepare season tickets, advertisements, pools coupons and so on.

Because of this, a league newcomer this year, Wimbledon, in south London, has had to accept fixtures prepared for the club it replaced, Workington, 270 miles to the north, in Cumbria. This has given Wimbledon a lot of travelling at Easter and Christmas, according to club chairman Ron Noades. One of its away games at Christmas, for example, is at Rochdale.

Even well-established clubs do not always get their own way. Bobby Roberts, manager of Colchester United, bemoaned the fact that his team had to travel to Bury on December 27 after a home game the day before, and Bill Dodgin at Brentford recalled having to travel to Workington for mid-week evening matches.

London is one of the most congested areas as far as football clubs are concerned, as West Ham secretary Edwin Chapman pointed out.

"We ask for our games not to clash with those of Spurs," he said. "But then Spurs don't want to clash with Arsenal. And we've got Orient just down the road."

So when your team wins the first division or gets promoted this season, don't put it down merely to them being a great bunch of lads, or believe Jimmy Hill's claims about that 89th-minute penalty on a muddy November evening being the turning point.

Remember that computer.

● "Nastran performed all the elastic analysis for the US space programme", says a press release on NASA's structural analysis suite. I'd always suspected that some of those rockets were driven by rubber bands.

The recent Hedsor Park conference organised by Computer Weekly and the British chapter of the ACM, entitled Can Computers Save Britain? (CW, July 14), gave fresh impetus to the move for the establishment of a clear policy for computing in the UK.

One of the people who responded to the Computer Weekly Call for Action to define and support such a policy was Malcolm Ballantine, who lectures on ergonomics and the effects of computers at work for the Department of Occupational Psychology at Birkbeck College, London.

Here Ballantine explains, as a behavioural scientist, the impact of information technology on society as a subject of importance, and why its effects should be made widely known.

How can 'non-workers' be educated?

FOR behavioural scientists, the call for an overall policy on the introduction and application of computers in the UK raises another problem. How can we make the ever-increasing number of computers in our midst more amenable to people?

Once again we are faced with the complexities which make the problem so difficult to solve. As a behavioural scientist who has been professionally concerned with these matters for some years, I would like to add my point of view to the debate.

On the surface, at least, there is an immediate problem to be overcome. Many people find computers difficult to understand and are further discouraged from trying to understand them because of the difficult vocabulary used by those who do understand them.

On the other hand, the effects of computing are probably even more complex — and many of the issues which arise are not directly related to the machines. Society as a whole must make the decisions which we will have to face in the immediate future, yet society as a whole is not at present able to make those decisions.

An analogy comes to mind, that of the internal combustion engine. In the days of horses we had roads and we had vehicles. In the last 50 years we have seen from the development of roads and road transport systems one of the most obvious changes which the human race has ever imposed on the surface of this planet. These changes have come about because of the internal combustion engine.

We have always had communication systems and the checks and controls which enable us to run our society. These are about to be transformed in a way which is at least equal to the changes we have seen in road transport.

And yet our approach to these problems seems at present to ignore the opinions of the vast majority of ordinary people who are affected by the changes, to cut off our decision-makers from the information they need and, to use the analogy, to proceed to design a motorway network in terms of carburettor settings and exhaust design. It isn't going to work.

People at large must become more aware of the impending changes. Computer professionals, in turn must be more open, help people to understand what is being done, and, above all, take a far less narrow view of the effects of what they are doing.

It is all very well making bold statements like this, but they are only one man's opinions, and they beg more questions than they answer. Let us look a little deeper. There seems little doubt that the most profound effects will, at least in the next 10 to 15 years, be on our working lives.

In a broad sense, there are questions that need to be faced up to here. What should our employment (or unemployment) policy be? Is 100% employment our primary objective? Or are we capable of, and prepared for, change that must otherwise take place in our attitudes towards unemployment?

To put that last point in the most down-to-earth way; how quickly can we rid ourselves of the feeling that getting money without working is scrounging?

That is what any plan which does not accept 100% employment as a goal implies. People will have to get as much money for doing nothing as for working. Where does that put our contemporary notions of motivation and incentives?

What sort of education do our children need? How do we educate the "workers" for their rapidly changing jobs? How do we educate the "non workers" for leisure? The young adults of the early 1990s are in infants school now, yet many of them are getting an education fit for the 1950s.

Educational evaluation has traditionally thought in terms of necessary knowledge, skills and attitudes. The analysis is becoming difficult to make.

From a humanitarian, and democratic, point of view the overall question to be answered here is "what do people want?" Yet even the mechanisms for finding the answers are not clear.

We can take a narrower point-of-view and look at the individuals in our society. What sort of jobs will the "workers" have? Will we allow technology to be the sole determinant of tasks, from which jobs are then assembled? Or do we design jobs and then adapt our technology to suit the people?

The former approach ... predominant to date ... a paradox is appearing ... in the process industries ... tendency has been to ... as much as possible ... machines can be so ... reliable than humans ...

Very often the ... human has been reduced ... of monitor-checking ... intervening only when ... ry. Total automation ... difficult and the evidence ... that it will be many years ... people can be replaced ... tely.

The paradox arises ... the level of automation ... ses so does the level of ... This in turn reduces the ... ciency of the operator ... detriment of the system ... whole. Increase the ... of the operator, so the ... goes, and the efficiency ... system as a whole increases.

There is an optimum ... automation which may ... than the maximum ... automation.

The truth of this ... has not been resolved ... everyone's satisfaction ... industries where the ... said to occur, and yet ... for automation of jobs ... have so far been little ... on a scale far wider ... ever been previously ...

The pessimists argue ... widely-held notion of ... trality of technology ... and that, to the ... technology is not only ... biased in effect but ... those with power in ... retain and increase that ...

Certainly the social ... raised by the future of ... gical development are ... What is happening? ... doing it? Who are they ... for? Who is to gain? Who ... losers?

Yet these issues seem ... those which are most ... ignored by systems de... and, for that matter ... behavioural scientists ... concerned themselves ... computing.

If we are to progress ... the issues with which ... start. There must be a ... dialogue between the ... and people at large. To ... the analogy, vehicle ... exhaust emission are ... carburettor settings and ... design. At motorway ... however, the real issue ... do with other things.

MALCOLM BALLANTINE — Computer professionals . . . must be more open . . . and take a less narrow view of the effects of what they are doing.

Guide to electronics firms in Europe

A SECOND edition of the guide to suppliers of electronic equipment and components throughout Europe is now available. Produced in English, French and German, the directory, European Electronics Suppliers Guide, gives details of 2,800 companies, including many in Eastern Europe. In addition to details of products; some manufacturers have also given synopses of their manufacturing programmes.

The products are grouped into chapters covering communications, computers, materials, production equipment, cables, etc, as well as specialised fields such as banking, education, defence, aviation, transport and office administration. There is also a section on US companies operating in Europe.

The guide is published by Verlag für Wirtschaftsliteratur of Zurich, and C. G. Wedgwood of London. Copies are available from General Sales Dept (CW), Room 11, IPC Electrical-Electronic Press, Dorset House, Stamford Street, London, SE1 9LU. Price £18.50 in the UK; $49 US; 100 Swiss francs or equivalent elsewhere.

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OP SPOT

. . . this week looks back to the days when man was master of the machine — and the subsequent reversal of roles.

OPERATING systems; who really wants them? Is ICL's George better than IBM's OS? Or vice-versa?

Back in the "good" old days, when OS meant Oh! Sugar and G1S was still being hatched, operators had great fun. Console logs could be "doctored", and audit trails existed only in the outback.

The machine needed men. The machine was our slave, and we were the masters.

How things have changed. Today, operators run around in ever-decreasing circles, trying to obey the machine as quickly as possible.

How fast have the roles reversed? Nowadays, there must be a whole generation of operators who think that the operating system is a vital part of the machine — a standard feature.

How many people have experienced both the IBM and ICL variants of operating systems? This must be confusing, for they have totally different approaches.

It would be interesting to hear from members of the computer fraternity in general, and operations in particular, of the problems encountered in using both systems.

So, dig deep into your operating system and tell us about the problems — or anything else you care to remember. So long as it is printable.

A Wordplex 7 shared logic word processing system has been bought by the Central Computer Agency as part of its programme exploring the applications of computer aided typing. CCA director Reay Atkinson is pictured on a visit to the Department of Education and Science, Darlington, where the system has been installed. Left to right with two members of the typing pool are: Chris Holman, government sales manager, Wordplex; Kenneth Baker MP, a director of Wordplex; Mr Hallett, controller, DES Darlington; Reay Atkinson; Harry Mallinson, managing director of Wordplex; and Derek Eldridge, head of systems consultancy division, CCA.

Honeywell and CFL in Level 6 agreement

COMMERCIAL transaction processing systems based on Honeywell Level 6 minicomputers are now being sold on a turnkey basis by Computer Factors Ltd, of Coventry. Medium-sized firms currently using VRCs and big mainframe users looking for small systems to handle specialised applications are seen as the two main types of potential customer.

Founded six years ago Computer Factors has about 400 customers with VRCs and has also sold nine General Automation TOM commercial systems. CFL says that the Level 6 based systems will complement TOM in its product range because TOM can have no more than four VDU terminals, while Level 6 can handle many more — in theory up to 56.

Under its contract with Honeywell's Minicomputer and Terminals Division CFL is also being supplied with a complete range of peripherals. CFL points out that all Honeywell hardware installed with its customers will be maintained by Honeywell's own field engineering force.

Applications software for CFL's Level 6 customers will be produced by another Coventry firm, Simdell. This is a software house specialising in small commercial systems which already works with CFL's TOM customers.

Simdell will convert an existing range of applications packages already available in commercial Fortran for TOM, to Cobol 74 for Level 6. These will run under the GCOS 6 operating system.

LETTERS

Always a problem to know what is required

IN the discussion on software manuals in Op Spot (CW, July 28) you state that "often they list hundreds of irrelevant facts yet fail to show the actual information required".

It is always a problem to know what is the required information, and what is irrelevant, particularly since no two users ever agree.

For this reason we provide comment forms at the end of each of our technical publications in order to make it easier for the users to inform us of any errors, and also to advise us of any recommendations they may have for improving the publications.

In the last six months, despite a major software release, only about 20 of these forms have been returned. Because of this low response we have recently carried out an inquiry, involving visits to nearly every European country, to find out what users think of our publications.

It is our aim to provide our users with the documentation they require. Whenever comments are received they are acted upon in the next revision, or if a significant omission or error is found, an addendum is produced specially to remedy the situation.

STEPHEN HOPKINS,
Senior Editor
CII Honeywell Bull
Paris

Solutions for the accountant

JOHN AMBLER, in the opening article of Computers and Accountant (CW, August 18), has, in limited space, done well not only to highlight the scope now available to accountants to limit today's drudgery but also the scope that could be available to them to pioneer the future.

His comment, however, that "it is extremely difficult to determine the power and flexibility of such a system (general ledger) from the sales literature" cannot go unanswered.

Perhaps there is some truth in this but any system adopted by such diverse organisations as Rank Xerox, the Stock Exchange, Massey Ferguson, Willis Faber and London Transport must speak for itself, and perhaps the real bugbear is that some accountants and DP specialists are unwilling to admit that an "off the peg" solution can be as all-embracing as the one they have developed and then have to maintain themselves.

One can understand their dilemma, but it is a fact that developments in packaged systems have been substantial over the past five years, and the new user not only can plan his implementation schedule with certainty but also knows his financial commitment.

ROY P. TAYLOR Chairman,
Package Programs Ltd

Just one criticism

THANK you for the reference to NCC's book "Planning for Standby" in the Focus article on independent power supplies (CW, August 4). In view of the praise for the "otherwise admirable book" it may seem petty to jibe at the one criticism but, in fairness to the NCC Members' Working Party who wrote the report, may I direct Focus to pages 35-39. He may have missed this chapter on his final reading but I feel that power supplies are given more than a mention, both in the text and in the checklist.

I was pleased Focus chose to bring this lesson of the New York situation home to British readers. Security is so often neglected until the misfortunes of others lead us to safeguard our positions.

L. P. WARING
Senior Consultant
NCC Security Unit
Manchester

Scanners cut costs

COMPUTERISED medical X-ray scanners can more than halve the cost of diagnosing growths in the body and reduce the length of a patient's stay in hospital by 25%. These facts emerge from a study of nine US hospitals, carried out by EMI, UK's world leader in X-ray scanners.

The study found that information gained from scans eliminated the need for many other tests and in many cases made exploratory operations unnecessary, thus cutting a patient's stay in hospital from 17 to 13 days.

Average diagnosis costs were reduced from £3,000 to £1,120 for an abdominal growth and £3,700 to £2,000 for a pelvic growth.

£40,000 profits

PROFITS of £40,000 on a turnover of £400,000 for the year to July have been announced by Datapro, the data preparation bureau. Company expansion during the last year has included the replacement of an ICL Key Edit 100 system at its Kingston branch with a 12-keystation ICL 8959 system.

Exciting things happen with Prime

Prime Computer helps design power cables and mix paints for heavy duty plant like this shovel. The contractor uses it to move thousands of tons for bridges and roads designed on his Prime computer. Prime's transaction processing has an exciting part to play connecting you to your business – instantly.

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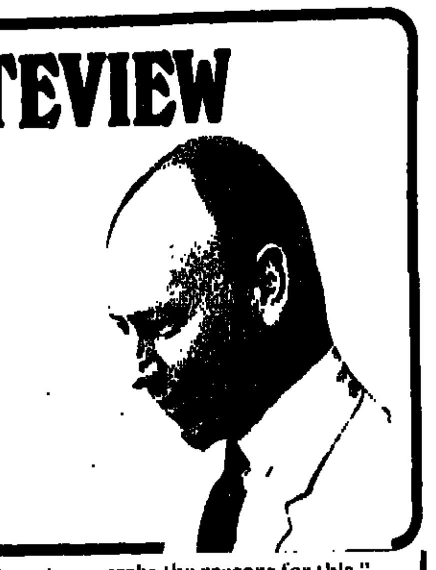
PRIME

MICHIE'S PRIVATEVIEW

The important thing is not to succeed...



SOME innocents might think that the patrons of a research project which met its objectives would be overjoyed and ready to keep the cash flowing freely. But, as many who live by scientific patronage have found to their cost, patrons can move in mysterious ways.

Take, for example, the speech-understanding project, funded by the US Defence Department's Advanced Research Projects Agency, Arpa.

It is remarkable enough that of the half dozen or so laboratories which started off in 1971 chasing a $3 million carrot and a list of impossible targets, one of them, the Carnegie Mellon University, has not only consumed its share of the carrot (that's easy) but has also actually done what it was contracted to do.

That, however, is a dangerous way to go with most research sponsors, for reasons to which I shall return.

First of all, let us take a closer look at Carnegie Mellon's venture, known as the Harpy Project. In 1971, 18 target items were specified by Arpa, including, for example, that the system should be able to accept connected speech — that is phrases, not individual words — from five different speakers of the general American language, with modest interactive capabilities, and a 9% error rate.

It was specified that it should cost about $5 a sentence and operate on a 0.35 million instructions per second Digital Equipment PDP-10 with 256K words. A further item was that it should be demonstrable with a moderate chance of success in 1976. And on August 13, 1976, Harpy did become operational, measuring up impressively to the 18 targeted items, over-fulling some and falling just a little short on others.

And what do you think Arpa's response to this was? It immediately withdrew funding and further interest in the project. So what then motivates a patron to unbelt?

First and foremost he does so in the natural hope that something will be done to interest him, to stimulate his imagination — something to surprise him.

If no definite goals have been agreed in advance, and in university-based research they very seldom are, the patron may suffer uneasy feelings at the time of launch; but the project has little to fear.

Since he has so little idea of what to expect, the patron is bound to be surprised at the outcome — most of all if the research team reports no success at all: "Surprisingly the problem proved more difficult than anticipated. Substantial increase in funding is needed to enable us adequately to probe the reasons for this."

If a patron has steadfastly withheld support and the project rushes on to success, there is truly a surprise.

But to say, as the Harpy team did, "We shall do thus and so, and from A we shall pass on to B and thence to C, marking off agreed milestones on their due dates, and in the fullness of time we shall attain to our grand objectives X on which we shall report to you, Sire, at length and in details." Yawn!

Yawn, that is, in the face of Harpy's achievement, as described in the final report of the Arpa steering committee of scientific advisers which concluded: "In 1971, when the project started, perhaps the majority of informed technical opinion put general speech recognition by computers as not possible in the foreseeable future and perhaps not possible at all ... Informed technical opinion can now be that general cost-effective speech input to computers is an attainable goal ... It would go a long way towards making computers easy to use and more accessible to the general non-technical public."

As for the fine team at Carnegie Mellon, they should have promised Arpa an underwater robot and then produced a speech - understanding machine. Or vice-versa. Either way, they'd be coining it now.

Auntie's Selling Time

The BBC Computer Unit has been selling time, service and back-up on the 1900 for years.

Now, we have 12 months' experience on the 2960 and we want to sell surplus capacity on both machines.

That's the 1904S/192K under George 3; and the 2960 3Mb, operating under 5X23 VME/B (VME/K can be made available) IDMS, MAC, RJE and TP facilities too.

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For more information contact Bob McLean, Computer Operations Manager, BBC, Sulgrave House, Woodger Road, London W12 8QT. Phone 01-743 8000, ext. 4974 or 4752.

BBC

SOFTWARE FILE

20% cut in disc space thanks to Filcon

A PRESTIGIOUS initial user has been gained for Trident Computer Services' Filcon disc-space management · software (CW, August 18).

The package has been acquired by Freight Computer Services, the DP subsidiary of the National Freight Corporation, for use on its Honeywell 66/20 in Birmingham

FCS has already reported a 20% decrease in the disc space required.

The company supplies computer services to the National Freight Corporation's subsidiaries. These include British ... Services, Nation... riers, Freightlin... Pickfords. The ... mingham centre ... accessed from oth... Enfield, Middles... Dumfries.

Result of Codasyl database meeting

THE views of the only UK-based Codasyl committee are having a material influence on the form of Codasyl's recommendations for database management strategy.

At a meeting of Codasyl's Data Description Language Committee in Minneapolis last month, the committee's response to suggestions for a separate language describing the storage organisation aspects of the database was finally settled.

The basic outline of such a language will be included in the next issue of the DDLC's Journal of Development, the ... appear early next year ... detailed syntax of the lang... will be published not as p... the main report, but a... appendix, bound in the ... volume.

One of the main Cod... lobbies for this Data S... Description Language a... Database Administration W... ing Group (DBAWG) ... group is jointly run by C... and the BCS Advanced ... gramming Specialist Gro...

The presence of a DSDL ... make a major change t... Codasyl recommendat... which have previously ... oriented to a central s... that included both da... organisation and storage ... mation, with surrou... subschemas describing ... dual "views" of the databa...

The removal of the s... aspects into a separate de... tion leaves the schema ... only abstract organis... information. Thus the Co... organisation is beginni... look increasingly like th... gested by ANSI's Stand... Planning and Requirem... Committee (Sparc), wi... separate "conceptual" ... for information purely ... logical relations of data.

Such a clear separati... abstract and storage ... has been repeatedly adv... both within and outside C... syl, the latest example be... an address at the IFIP co... by G. M. Nijssen of Contr... (CW, August 25).

At the Minneapolis mee... was decided not to perm... subsequent major updates ... Journal of Development, ... minor "editorial" chang... still expected.

The new JoD will be th... full version to have been ... since 1973.

Prof Wilkes for 2nd Mumps conference

THE growing European user group for the Mumps multiprogramming operating system and language (CW, September 16, 1976) is to hold its second annual meeting in the UK later this month.

The meeting will take place at the Royal Institution, Albermarle Street, London, from September 12 to 14. The chief guest speaker at the conference dinner will be Professor Maurice Wilkes, of Cambridge University.

Professor Maurice Wilkes . . . chief guest speaker at the second Mumps conference.

Mumps was originally developed by Massachusetts University for Digital Equipment PDP-11 minicomputers. The system has since been adapted to a variety of other equipment, and the coming meeting will hear at least two addresses on application to microprocessors.

Richard Walters, of California University will speak about a high-level microprocessor implementation of Mumps aimed at portability. This has already been implemented on Intel 8080 and Digital LSI-11 micros.

A representative of the German company Grips, will present its own Grips system, a Mumps implementation on a network of micros. Separate processors can handle separate functions, for example, data management and program interpretation in parallel.

The meeting will include a total of 25 papers, in addition to several "workshop" discussion sessions, on such topics as "Mumps for managers." Fee is $115 (£66) for members of the user group, $140 (£80.50) for non-members, and an extra $15 (£8.62) for the dinner.

First benefits of LUCS takeover

THE takeover of London University Computing Services by United Computing Systems of Kansas (CW, January 20) has brought its first benefit in new software terms. LUCS is offering the Nastran structural analysis suite, already handled by the US bureau.

Nastran, already provided by several other UK bureaux, was developed by the US National Aeronautics and Space Administration and extensively used in the US space programme.

Its big attraction for LUCS was its "dynamic" analysis capability; predicting the effect on structures of varying forces and vibrations.

LUCS' existing structural analysis software, from engineering consultancy Freeman, Fox and Partners, caters only for "static" forces.

Nastran was not imported for a specific LUCS client, sa... spokesman, but several ... had expressed a need for ... mic analysis. A number of ... were examining Nastran ... great interest, he added, ... firm contracts had been si... yet.

LUCS confirmed that ... likely to be further import... packages from the US bur...

Puzzler

PLACE 10 pennies in a row, and then try your luck at transforming them into five stacks of two coins each in five moves, under the following conditions:

Each "move" must consist of picking up a single penny and passing it over exactly two others (left or right) to land on another single penny. The two coins passed over may be either two singles, or one already-stacked pair. See page 81 for solution.

Release of Padds

THE graphics software Padds, long under development by the Production Engineering Research Association has been generally released.

Padds is to be marketed with a purpose-built plotter terminal, based on a Digital Equipment PDP-8, and run via a connection to the Scicon bureau's Univac 1108s in Milton Keynes, Bucks.

Padds is designed to provide detailed drawings of engineering components. When rough drawings have been produced, the engineer enters a description of the part's geometry in standard engineering terms. A detailed drawing is generated, with information on dimen... tolerances, surface finish ... ment required after ma... ture, and other param... essential for controlling ... facture and the buying ... materials.

Although the bureau ma... does the main processi... interpretation of plotter ... is done within the min... puter. This means that ... information can be sent ... terminal in a brief form ... ing transmission ...

Padds already has som... installations, one being ... Birmingham works of ... Salisbury Transmission ...

EDITED BY STEPHEN BELL

Details of Scicon's major order with Brazil oil firm

A LARGE project in database selection and implementation consultancy has been completed by Scicon for Petrobras, the Brazilian state oil corporation. Several US and continental consultancies are said to have been competitive bidders for the contract.

Petrobras' information requirements were ambitious, including management of data on planning, personnel, materials requirements and purchasing, in addition to the main business, the purchase of crude oil, its refinement and the sale of the products.

A comprehensive evaulation of all these information needs formed the first phase of the project, which began two years ago. Following this, Scicon had to decide whether a conventional file or database system was more appropriate as a solution.

Having decided on a database approach, selection of an appropriate database management system and associated software was the next stage. The human and machine resources available for the development then had to be assessed and a development plan laid out.

Petrobras is no newcomer to the DP scene, having had IBM hardware for some years. At present, the company operates a large IBM 370.

The database implementation thus had to be considered not only in its own right, but also in terms of its interaction with other complex software, including linear programming models used for planning.

The software selected was based on Cincom's Total database management system, together with the same company's Environ/1 teleprocessing monitor and Socrates report generator.

The choice was severely narrowed by the availability of support in Brazil. The only reasonably supported software, said a Scicon spokesman, were the Cincom products and IBM's own software. Cincom has its own office in Rio de Janeiro, handling the whole South American market.

Following the selection, Scicon has been assisting with planning, implementation and staff training. Although the system has not yet been completed, Petrobras has now achieved a state of self-sufficiency allowing Scicon to terminate its involvement.

Scicon was one of the first companies to specialise in database consultancy, an area since approached by many firms. The company claims to have developed a comprehensive methodology, known as Dataplan, which was employed in the Petrobras project.

Some scepticism has been expressed in the past regarding Scicon's simultaneous activities as an independent database consultancy and as UK agent for Cullinane's IDMS database software.

The successful conclusion of a consultancy contract for the largest company in South America, particularly with selection of a non-IDMS database, should serve to further quieten these doubts.

Learning to live with database

WITH the acceptance of the database concept, seminars on the subject have tended away from the theoretical and towards airing of practical experience and consideration of day-to-day problems.

The latest event of this kind is due to be held on September 22 at the Cafe Royal, London, and is sponsored by BIS Applied Systems. The seminar is designed for managers who have a database, or are contemplating acquiring one.

Speakers will come from a number of prominent database users, including Hawker Siddeley Aviation, British Airways and Commercial Union Assurance. Chairman will be David Firnberg, director of the National Computing Centre.

Cost of the seminar is £80 plus VAT. Further details from Dorileen Culling at BIS.

Stockbrokers get WHAM

A COMPUTER system based on two Data General Eclipse S200s, that enables stockbrokers to obtain up-to-date information for trading is being offered by Weeden Holding Corp in the US.

Called WHAM, Wheeden Holding Corporation Automated Market, it can handle up to 100,000 transactions in a six hour day.

Traders can use either Sycor intelligent terminals or software programmed intelligent terminal clusters from Incoterm.

Wheeden Holding Corp has already invested $700,000 in the system and has said that estimates for establishing a similar "central market" have been put as high as $30 million.

Rainer Burchett

Roger Learmonth

Implement a DBMS ...in four stages

THE growing user need for advice on database implementation has already been approached by several existing software companies (CW, December 9, 1976 and January 13). Now a company has been formed to deal specifically with database consultancy.

Learmonth and Burchett Management Systems, based in London, was started by Roger Learmonth and Rainer Burchett, both previously principal consultants with BIS Applied Systems.

They have devised a methodology for developing a database structure suited to a company's operations and information needs, and setting practical questions of implementation and performance.

This strategy will be marketed in a variety of ways. The company intends to take on full database evaluation studies for clients, assist them in database design or implementation or train their own staff to use the methodology.

LBMS' approach is to break down the process of database implementation into four clearly separated stages, so that design of the data structure, for example, is not handicapped by having to consider likely performance problems at the same time.

The user begins by analysing the data resources and relationships into "third normal form", according to the relational procedures developed by Ted Codd, of IBM. This task, on the surface complicated and discouraging to many users, is aided by standard forms and documentation.

The second stage, logical design, involves conversion of these natural data relationships into a data structure which meets the company's needs for information.

These two software-independent design phases are followed by a physical design, on the basis of the user's selected database management system.

Appropriate documentation relating to the most popular DBMSs is provided. Lastly the physical design is optimised in line with security, performance and disc-space requirements.

There is bound to be some scepticism about the feasibility of separating these considerations entirely, but initial reception for the LBMS philosophy seems good. The company already has four clients signed up for its services, though no names have been released yet.

Amending interactive records

AN interactive record amendment facility, using the standard ICL direct data entry terminals, is being developed by CRL-Abacus for its source library maintenance system for 2903s and 2904s, Ablib (CW, August 11).

Data can already be input either on cards or via the direct data entry terminals in the normal batch mode, but the new facility will enable users to call up records, amend them and write them back in real time.

PROGRAMMER NOTES

Set up Cyborg's structured program system as test case

IN the past few weeks, Programmer Notes has discussed the use of program generation aids and the enforcement of structured and modular programming standards and individual installation standards.

A product has been brought to our notice which draws all these threads together. In fact, in the light of the increasing popularity of structured programming, its developers, Cyborg Software Systems, has changed the name from Modular Programming System to Structured Programming System, with appropriate changes in the software.

Rather than talking nebulously about the usefulness or adverse effects of such aids, it might be instructive to set this package up as a "test case", and invite criticism of its specific approach. This could prove instructive as regards the acceptability of these tools.

SPS is claimed to have been devised as a result of a survey of programming practice in many installations. This implies that such a survey has enabled Cyborg to build up a general picture of desirable programming techniques.

There are obviously some broad principles, such as top-down programming and modular structures, which have become generally accepted; but SPS, like many such products, lays down rules at a more detailed level. It stipulates, for example, that Cobol modules should be controlled from higher-ranking modules via "Perform" statements only.

The top two levels in the module hierarchy are fixed; one "control level" supervising three "major levels", which correspond to "initial", "Main" and "final" processing. Below these are user-written sub-levels and subroutines.

Each module must have one entry and one exit only, and must include an initial block of comment. Paragraph naming conventions are also defined; the names being letter-number sequences, with optional "meaningful" suffixes.

A standard "program skeleton" enforces these restrictions and allows an installation's management to add its own. Violations are indicated as errors in a "pre-compiler" phase, which also generates flowcharts. These now include symbols for the sequenc , iteration and selection constructs of structured programs.

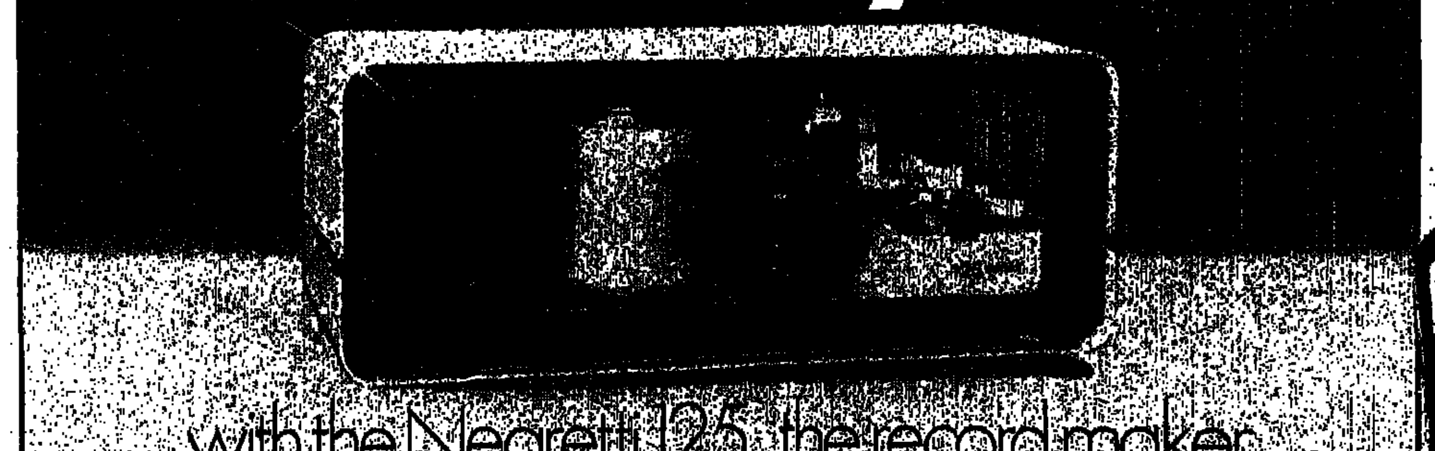
This form of programming constraint arising from a software developer's idea of what the programmer wants is typical of such products. Does this really represent the programmer's requirements?

Can anyone with experience of such aids tell us whether they work, in terms of increased productivity or more maintainable programs; or do they simply cramp the programmer's style?

SPS was conceived about three years ago, and has since been updated, particularly to deal with the rise of structured programming. According to several of our correspondents, however, structured programming is the way good programming has always been done.

This raises another interesting question. How real is the evolution of programming style, on an individual or general basis? Do you find your style has changed; and is it as a result of your own experience, or the DP community's current ideas on what constitutes "good" programming?

'climateyes



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Microprocessor News

Elevator control for high rise buildings

US Elevator's William Hoelscher holds the microcomputer system designed to control eight elevators. Behind him, one of the three electrical cabinets that the system replaces.

ONE of the classic control applications for the microprocessor, discussed in detail at many a seminar, is the elevator in high rise buildings. Now US Elevator of Spring Valley, California, has produced one, and ironically is finding little opportunity to apply its expertise.

The US Elevator system, the work of William Hoelscher, the firm's chief electronics engineer, is capable of controlling the operation of up to eight elevator cars serving buildings with a maximum of 48 storeys. Since not all evelators stop at all floors in high rise buildings, the eight can be stretched to cover a 100 storey building.

It offers all the advantages normally available with microprocessor systems in terms of saved space, lower cost and greatly increased reliability, yet there is a minor problem. In the words of Hoelscher, "Presently, there aren't many new buildings under construction".

But every cloud has a silver lining, for as Hoelscher points out, "The elevator systems in many old buildings are wearing out". The company has found at least one new building in which to install the system.

A contract for an old building is being sought, primarily to evaluate and demonstrate the possibilities of mating the new system to old equipment. Hoelscher admits that interfacing the two does have its problems.

GIM debugging system

A PROGRAM debugging system for use with the PIC 1650 single chip microcomputer has been introduced by General Instrument Microelectronics. Called the PIC 1664 development microprocessor, the system provides access to an external PROM program store.

In this way, operating programs for the 1650 can be tested before being committed to the device's on-board, mask-programmed ROM. The PIC 1664 is identical to the 1650 with the exception that the on-board ROM, which has a capacity of 512 by 12 bits, has been removed from the chip. Instead, the ROM address lines are brought outside the package for connection to the PROM.

The system has been designed to accept a variety of standard PROM devices to make up the required capacity. Favoured configurations by GIM are three, 256 by 8 bit or three, 512 by 4 bit memories.

Although the PIC 1650 is intended primarily for industrial and control applications, where an extensive repertoire of program steps are not normally needed, its memory capacity can be extended up to 1K by 10 bits by adding on a PIC 1664. This can be achieved by using one of the bit registers associated with each I/O pin as an extra address bit. Together with the 9-bit program counter register it provides a 10-bit word instruction address capability.

Euromicro 77 symposium

NEW concepts, recent developments and future technical possibilities will be among the subjects covered at Euromicro 77, a conference being organised by the European Association for Microprocessing and Microprogramming.

To be held in Amsterdam, from October 3 to 6, the conference will range over a variety of subjects in the micro area, such as microprocessors, bit slices, microcomputers, microcomputer software, microprogramming, multimicroprocessor systems, design aids, debugging tools and microprocessor applications. In addition to this scientific programme, manufacturers will also have the opportunity of presenting their latest products and developments in the areas covered by the conference.

Further information and registration forms can be obtained from the Euromicro 77 Conference Secretariat at Congres Bureau Vrije Universiteit, De Boelelaan 1105, Amsterdam, Holland.

Intel's control device

A micromputer-based peripheral control device has been introduced by Intel that can be used with any microcomputer system employing a standard bus structure.

Designated the 8041 Universal Peripheral Interface (UPI), the device controls peripheral handshaking and protocol procedures, and also performs such functions as pre-processing of data, error-checking, code conversion, arithmetic operations and formatting.

It comprises a CPU, 1K bytes of program memory and 64 bytes of read/write memory. Data transfer between the system and the UPI takes place via the data bus and an on-chip 8-bit data buffer. The device uses two 8-bit programmable I/O ports for interfacing with the outside world, and this can be expanded by using the type 8243 which can be cascaded to provide virtually any number of lines.

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PEOPLE

Pensioner Mrs Jessie Beasley receives a prize of groceries at a sale organised by children in aid of the Coventry Hospital Scanner Appeal.

Coventry's generous response to Scanner Appeal

IT seems as though the whole population of Coventry and the surrounding area must be helping the Coventry Hospital EMIscanner Appeal in one way or another, either by organising events or by attending them.

Events have included a sponsored walk, a jumble sale run by a 13-year-old girl, and a barbecue, and Coventry City FC has announced that all players' fines will go to the appeal.

Local industry, including Mitchells and Butlers brewery and 200 of its licensees, is generously supporting the appeal, started by neurosurgeon Bill Whitmore and Coventry businessmen. It aims to raise £150,000 by next March to cover part of the cost of an EMI X-ray Scanner, which is used particularly for cancer detection. Anyone wishing to contribute should contact the Appeal committee chairman, Mr Cotton on 0203 22037.

Royal Marsden Scanner Appeal.— In the London area, the Royal Marsden Hospital Scanner Appeal has been launched in the computer industry to raise the cost of the computing element in the hospital's newly acquired EMIscanner. Companies and private individuals wishing to contribute can contact the Cancer Research Campaign at 2, Carlton House Terrace, London SW17, or the appeal organiser, David Ayers at Tritech Computer Services, 01-948-4213/4.

Liveware File by Don

Numerical Control elections

IN elections at the British Numerical Control Society, **M. P. Hewitt** has been made president in succession to **Sir John Toothill**, the society's first president. Hewitt is director and general manager of Plessey Numerical Controls Ltd and is a member of the councils of MTIRA, MTTA and the IProdE.

Chairman is **Ian Coull**, who has been chairman of the Western Region and of the Scottish Region. **Jimmy Dawson** becomes vice-chairman — he is sales director NC of Kearney and Trecker Marwin.

William Smith has rejoined Data General at their Massachusetts HQ as corporate director of marketing communications, a job he held with them between 1973 and 1975. Latterly he was a partner of Bedford Associates, a Connecticut consulting firm.

Sergio Ferragut becomes director of international marketing with Cullinane, Corp of Massachusetts. He was formerly president of Servicios de Information, the DP subsidiary of Aurrera, which is the largest department store chain in Mexico and a subsidiary of Jewel Company of Chicago.

Peter Frost, a director and production executive of Coutant International, has been appointed director and general manager of Coutant Electronics' Ilfracombe plant, of which he has been general works manager for three years.

Ken Cockerill goes to Geest Minicomputer as a systems sales consultant from Redifon Computers, where he was a territory manager.

Brian Wells, until recently chief Accupower engineer with Emerson Industrial Controls, has now become quality control manager.

Michael Treston has left Interscan, where he was OCR support manager, to join Memory Ireland as computer sales manager.

Soccer

Northants Computer Weekly Cup

TEAMS of computer staff from installations all over Northamptonshire are competing for the Northamptonshire Computer Weekly Cup in a five-a-side tournament this Sunday. The tournament is being organised by Alan Rance a programmer at Avon Cosmetics and is the first of what will become an annual event held in a different part of the country each year.

The tournament starts on a league basis, with group winners going on to a knock-out competition. Over 25 teams are taking part. The Computer Weekly Cup presentations will be presented by Ian Best, captain of Northampton foo

Summer Computer League dance

THE London Summer Computer League is having a floating social evening at the end of September. The river trip will include a disco, buffet and bar. Tickets will cost about £2 80, including buffet. The organiser, Danny Bareham, needs some idea of the likely number, so captains please telephone him on 01-240 3223 as soon as possible.

The Computer Weekly Cup for division one, the Eurocopc Cup for division two and the Wellcome Cup for division three will be presented that night.

Latest results

Division I
Lloyds 8, Comshare 1
London Transport 5, Southwark 0

Division II
Lambeth 5, Computer Weekly 0
Southgate 5, Computer Weekly 0

CONFERENCES

AT the next meeting of the BCS Information Retrieval Specialist Group three talks on the subject of computer access to large databases using alternative store technologies will be given. Ken Groves of Stabletron will speak on computer-controlled remote microfilm retrieval systems; Peter Waterworth of Plessey on mass storage using holographic techniques, and the impact of automated microfilm retrieval in the R&D environment will be the subject treated by Roy Brierley of Wellcome Research Laboratories. The meeting will take place at the City University, London on September 28, and tickets (£1) may be obtained in advance from Pauline Walters, The British Computer Society, 29 Portland Place, London W1N 4HU, tel 01-637 0471.

THE automation of the mass-production of small and medium-sized goods is the subject of an exhibition to be held in Berne, Switzerland, on September 19-24, the Salon International de la Production Automatisée, SAMA 77. Various aspects of electronics and telecommunications will be represented. For further information contact the organisers, SAMA International, CH-2501 Bienne, Switzerland, tel: 032/23 00 36.

A SEMINAR on computer security and privacy will be held by BIS Applied Systems on October 20 at the Café Royal, London. Speakers will include Peter Hamilton, a director of Chubb Security Services and editor of Handbook of Security; Ray Ellison, head of security NCC; Ian Watson, the partner in charge of audit at Peat, Marwick and Mitchell. Subjects covered will include fraud, industrial espionage, destruction of information and the privacy of personal information in computer systems. Further details may be obtained from Bernard Culling, BIS Applied Systems Ltd, 91 Blackfriars Road, London SE1 8HW (tel: 01-928 9511.

INFORMATION security and word processing are the subjects of two conferences organised by Online for early autumn. The conference on the protection of computerised information will take place on September 27-28, and is aimed at management responsible for the measures to guard against industrial espionage and sabotage as well as embezzlement and information piracy.

An examination of the basic word processing system, word processing in practice, the less-paper office, developments in printing technology, the keyboard interface and implications for data processing are some of the aspects of word processing which will be dealt with during the conference on this subject on October 25-26.

Both conferences are non-residential and will be held in London, at the Rapier Centre Hotel. Further details are available from Online, Cleveland Road, Uxbridge UB8 2DD, tel: Uxbridge 39242.

DIARY

SEPTEMBER 6-9
Compcon '77 — micros, minis and maxis. IEEE (USA). Washington, DC.

SEPTEMBER 7
Developments in micropublishing seminar. Microfilm Association of Great Britain. Oxford. Details: Executive Secretary, MAGB, 8 High Street, Guildford GU2 5AJ.

SEPTEMBER 7-8
Registration for BCS exam courses, and HNC in Computer studies. Slough College of Higher Education, Slough. Details: Dr E. Huzan, tel: 75 34585, ext 5.

SEPTEMBER 7-9
Symposium on data analysis and informatics. Institut de Recherche d'Informatique et d'Automatique. Rocquencourt, France.

SEPTEMBER 8
Database management, focus on user experience, seminar. BCS. Holiday Inn, Birmingham. 9.30.

SEPTEMBER 8-9
Meeting. IBM Computer Users' Association Programming Group. De Vere Hotel, Coventry.

SEPTEMBER 11-16
Stored program control of telephone switching systems — second vacation school. IEE. Colchester, Essex.

SEPTEMBER 13-15
Experience and technology of databases. Online. IEE, Savoy Place, London WC2.

SEPTEMBER 14
Computers and privacy/joint meeting. Alex Lyon (G. Fisher chairman). BCS Leeds and Humberside branches. Royal Station Hotel, York. 18.30.

Display word processors. Roger Woolfe. BCS. Sussex branch. Imperial Hotel, Hove. 19.30.

LAMIS. BCS, Dundee branch. Queens Hotel, Dundee. 19.00.

SEPTEMBER 14-18
Meeting. IBM Computer Users' Association Scottish Group. Esso Motor Hotel, Erskine.

SEPTEMBER 14-16
Society for Management Information Systems, annual conference, Dallas, USA. Details: SMIS, SUITE 2026, 221 North LaSalle Street, Chicago, Ill 60601, USA.

SEPTEMBER 15
Vandalism, sabotage, it couldn't happen to us — the security aspects of operations. BCS Operations Group, Polytechnic of Central London. 16.00.

Computers and people. G. A. Fisher. BCS, Guildford branch, Civic Hall, Guildford, Surrey. 19.30.

The proposed traffic control system for Norwich. Dr A. J. R. Rawley. IEETE. Assembly House, Theatre Street, Norwich. 19.30.

September 19-23
Applications of numerical software, conference. Institute of Mathematics and its Applications, Scotland. University of Sussex, Brighton.

COMPUTER WEEKLY

The following special supplements are due to be published during

SEPTEMBER

INTERNATIONAL EDITION + BONUS CIRCULATION

SICOB PREVIEW

September 8th

In September, Paris awakens from its August holiday slumber to falling leaves and SICOB, one of the major European computer shows.

Computer Weekly, of course, has no summer rest and our international issue on September 8th will be filled with its usual wide ranging coverage of the world computer scene, including a special preview of this year's SICOB. Where Computer Weekly will be exhibiting for the first time and additional copies of this special issue will be distributed from our stand. With an overall distribution of over 96,000 (U.K. 73,873, Overseas 21,048) this issue will provide an ideal opportunity for export minded companies to display their products, equipment and services to this unique audience of decision makers throughout Western Europe.

SYSTEMS and SOFTWARE HOUSES/ EUROCOMP PREVIEW

September 15

Software can truthfully be said to be the life blood of the computer system. Without some controlling software, the most advanced computer hardware is incapable of performing even the simplest tasks. The falling cost of hardware has also made software an increasingly important factor in the costs of running a computer installation.

On September 15 Computer Weekly will publish a special supplement on 'Systems and Software Houses'. In this issue, we take a look at some of the types of software which the user of today is likely to be seeking — from data dictionaries to application programs — and experts in the field give some guidance on software selection. We also highlight some features of the changing shape of the software industry.

DATA STORAGE MEDIA

September 29

Data storage media can come in widely different forms these days — anything from the humble punched card to the multi-Megabyte semiconductor main memory store. A section of a microwood access time.

Some of the most important developments in this wide area include the practical application of bubble memories, the proliferation of floppy disc systems, and the rapid increase in the densities of MOS memory and mass digital storage. The Data Storage Media Supplement on September 29, will cover these subjects and many others and include information and views from suppliers and independent consultants.

LONDON AND WESTERN
Stephen Measures 01-261 8293, Tony Kaminski 01-261 8022, Barbara Mitchell 01-261 8108, Lloyd Collins 01-261 8767.

MIDLAND
Ken Perrott 021-356 4838

NORTH AND SCOTLAND
Harry Aiken 061-872 4211

Stop Press: Computer Weekly continues to publish more pages of recruitment advertising and has a higher total newsprint circulation (Audit Bureau Circulations) of 72,873, than any other U.K. computer publication. Additional 21,048 regular readers in Western Europe for the INTERNATIONAL EDITION, which is published the first week in every month excluding August and December.

A special event from the Infotech Minicomputer Division

Minicomputers for Commercial Real Time

4 - 6 October 1977 London

- Growth of commercial real time systems.
- Mainframe or mini - a comparison
- Interconnection methods and protocols.
- Minicomputers for system enhancement.
- Design considerations in commercial real time minis.
- Software, operating systems and languages.
- Staffing, maintenance and implementation.
- Distributed processing systems.

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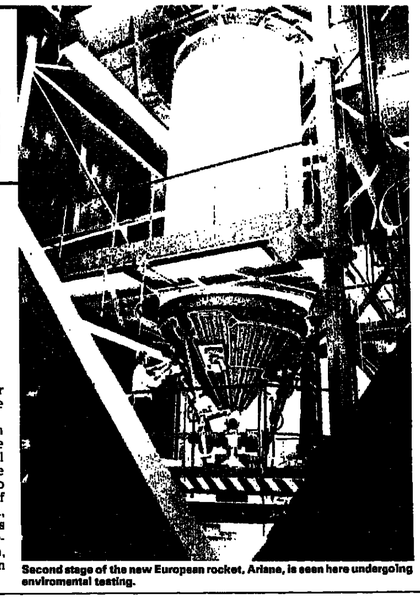
Novas used in rocket testing

THREE Data General Nova computers are being used to check-out instruments and run simulation programs on Ariane, one of Europe's latest rockets and successor to the earlier Europa I and II types. A Nova 2/10 is used to control and process input data, and to compress this so that it can be prepared in analogue converters. Another Nova 2/10 and a Nova 2/4, interfaced to this main computer, are used as intelligent terminals.

Experimental data is displayed in real time on a VDU attached to the main Nova 2/10.

The main purpose of the tests is to observe possible in-flight behaviour of the materials used in the second stage of the rocket, and the work is being carried out by engineers from VFW-Fokker and its subsidiary ERNO.



Second stage of the new European rocket, Ariane, is seen here undergoing environmental testing.

Camol for Army courses

THE Royal Signals Trade Training School at Catterick has installed an ICL 2903 to run the Computer Assisted Management of Learning system developed jointly by ICL, Brighton Polytechnic and Ulster University as part of the National Development Programme in Computer Assisted Learning (CW, April 8, 1976).

The Camol system helps teachers and students to monitor progress through courses. It includes facilities for multiple choice examination marking and analysis, and is used by two polytechnics, Ulster University and six secondary schools.

The Catterick school trains the 8th Signal Regiment and also runs courses for soldiers from other corps, and from foreign armies.

The school has itself been running a £15,500 project as part of the national programme. The project involved examining different learning management systems to see how they could best meet its needs.

NEWS IN BRIEF

Bank buys up COM bureau

ONE of the biggest computer output microfilm bureaux in Europe, Eurocom Data (Holdings) Ltd, is now 100% owned by the National Westminster Bank. This follows the purchase by Nat West of the 50% share held in Eurocom by the US Bancorp of Portland, Oregon. This organisatio owns the US Datacorp, the biggest COM bureau in the US.

Founded in 1974, Eurocom Data now has four branches in the UK — in the City of London, Rickmansworth, Manchester and Leeds, three in Sweden, two in West Germany, at Frankfurt and Dusseldorf, and one in Copenhagen. Taking over as managing director of the whole operation is John Wallace, formerly controller, audit and control, in NatWest's own DP department.

THE opening of EMI's new computer centre in Hayes, Middlesex has given Wright Air Conditioning's London subsidiary its biggest order. The company has supplied six Wacpac air conditioning units and designed a special panel for monitoring them. The centre includes an 800 square metres computer suite housing a dual Honeywell 66/40 and an ICL System 4 (CW, July 1, 1976).

FOLLOWING the merger of modem manufacturer Milgo Electronic Corp with Racal Electronics, the Miami firm has been renamed Racal-Milgo Inc. The merger was announced early this year (CW, February 24) and made effective on August 11. Meanwhile Racal in the UK has increased its share in the alarm and electronic equipment manufacturer, the Brocks Group, to more than 11% and taken a 5.45% share in the Adwest mechanical and electrical engineering group.

A COMPUTER was used for the first time to process results in the Chichester Harbour Federation Regatta Week. The machine, a small B80 system, was loaned by Burroughs, which also wrote the software. The system held details of each race and all 350 entries and printed results, taking into account handicaps.

A LEAFLET is now available from Intel which describes its Insite program library. It explains how micro users can join Insite (the Intel Software Index and Technology Exchange) and lists more than 250 programs covering a wide range of applications that are available through the library.

AVAILABLE from Dicoll Electronics is the Votrax ML-1 voice generating unit costing about £7,000 which translates digital computer output into synthesised human speech. Its applications for handicapped people are obvious and the unit has a capability of 122 phonemes, and four phoneme rates (variations in a group of speech sounds in a language).

CONTROL of the environment at IBM's multi-storey education centre at Greenford, Middlesex, is to be aided by masking windows with Madico solar film, made by Doulton Glass Industries. The film is intended to reduce glare and internal room temperatures.

Cost of military software '20 times greater'

A STUDY by US market consultancy Frost and Sullivan claims to have uncovered a 20 to one difference between the development costs of military and commercial software. The high cost of military development, says the report, applies not only to complex real time systems, but also to programs similar to those in commercial use, such as management information systems.

The US armed services will spend $6.68 billion on software during this financial year, states the report. This puts the cost per debugged machine-code instruction at $30. A US consultant on cost estimation in the commercial field says that even a pessimistic estimate would not put costs above $1.5 per instruction.

Spokesmen for Software Sciences and Systems Designers Ltd, both experienced producers of military software in the UK, conceded that a similar disparity existed in this country.

Neither company had collected detailed comparative statistics, but the figure of 20 to one was thought unlikely, even for efficiency-critical real time projects.

The efficiency, reliability and low core occupancy required of military software are the chief factors influencing the cost, said SDL director Phil Swinstead. "This may be considerably higher than the cost of simple commercial software, but some of the more complex commercial systems, such as process control suites, are of the same order of cost as military programs," he said.

Fred Eldridge, of Software Sciences, concurred. "You don't expect a single-seater sports car to cost the same as a family saloon," he said. When efficiency costs were discounted, there could still be factors conducive to a higher military cost.

"Military users often go for the newest hardware, which may be potentially more efficient, but still have teething troubles. The commercial installation is motivated totally by cost, and prefers to wait for the new hardware to prove itself."

Another important problem could simply be the size of the organisation. "A commercial development is controlled by the DP manager and only needs to satisfy a specialist group of users. In a military environment, several parallel sections of users are defining their own requirements for the same system, which makes co-ordination more difficult."

Duke to open Business Show

THE Duke of Kent is to open the International Business Show, to be held at the National Exhibition Centre, Birmingham, from October 11 to 20.

He will fly in by helicopter to tour the exhibition before the official opening of the show, which BETA (Business Equipment Trade Association), the organisers, we hoping will add substantially to UK office equipment exports. These totalled about £699 million in 1976.

Miltope range

THE range of specialised military computer peripherals manufactured by the Miltope Corp is now available in the UK through Sintrom-Elliinor. Consisting of high speed printers, magnetic tape transports and controllers and flexible disc systems, the product range is manufactured to full military specifications.

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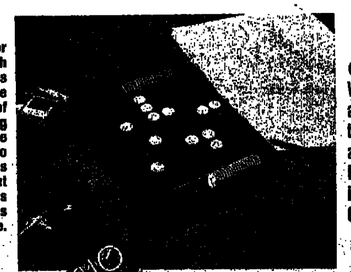

OTHELLO is a game of strategy for two players. It is played with two-sided, black and white counters on a squared board. At each move you capture one or more rows of your opponent's pieces by trapping them between your own pieces. The captured pieces are turned over to show your colour. The process switches back and forth throughout the game, and part of the appeal is the potential for dramatic reversals right up to the last move of the game.

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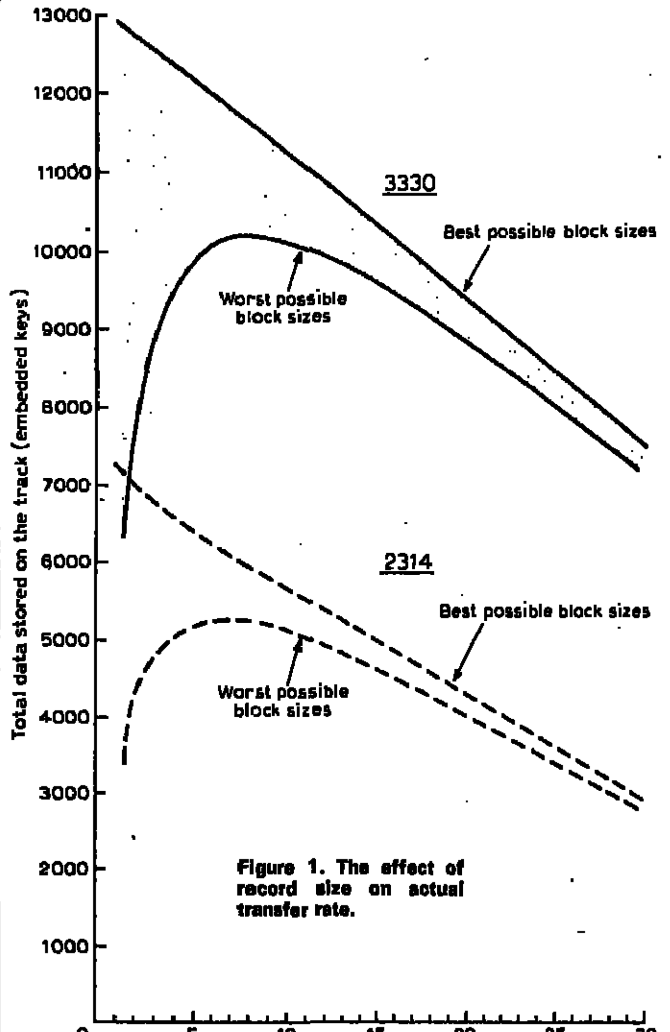

Figure 1. The effect of record size on actual transfer rate.

FILE DESIGN

By Owen Hanson

Storage devices

Part 10

IN theory the file designer should consider a number of media before deciding which to use; in practice the choice usually lies between magnetic tape and removable disc.

Drums and fast fixed-head discs are limited in capacity and therefore most used for table or index storage. Magnetic card devices such as CRAM or data cell provide slow access but massive storage capacity. Their relative lack of speed and reliability has led to the substitution of the modern fast, very high capacity removable discs in most cases, although they can still be found in insurance applications. The National Insurance installation in Fleetwood uses CRAM, for example.

The range of discs and tapes available is very wide. Table 1 gives details typical of devices that are available from most major manufacturers.

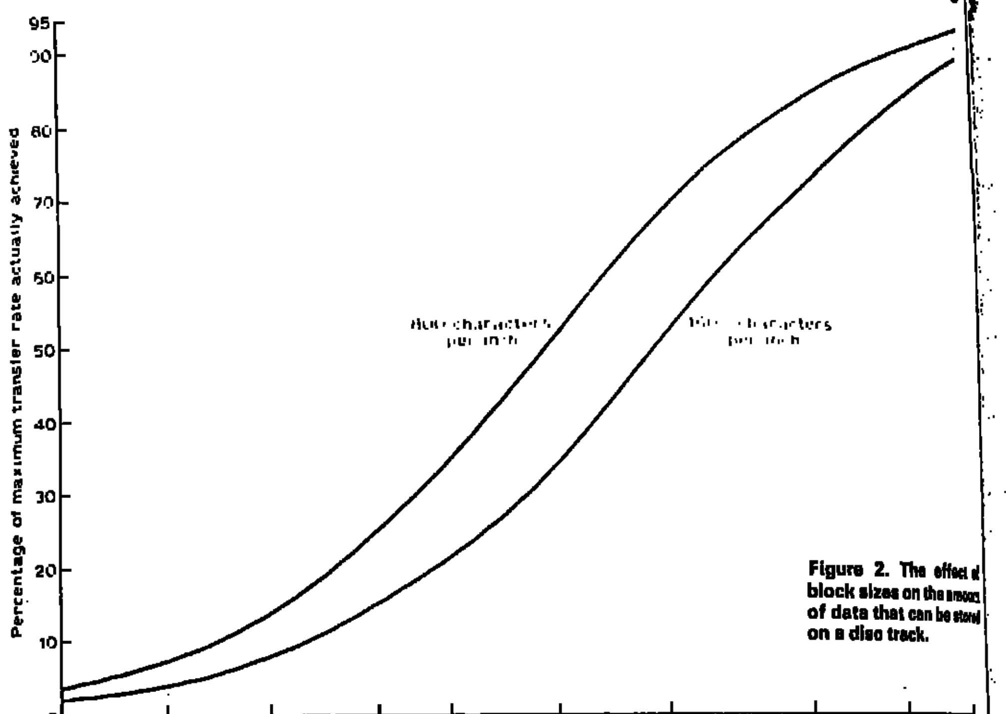

Figure 2. The effect of block sizes on the amount of data that can be stored on a disc track.

Magnetic tapes

The data given in Table 1 covers most modern tapes, although users may still have slower, older equipment. Recording densities of 800 / 1,600 characters per inch imply that a potential storage space for 480/960 bytes is lost in each inter-record gap.

The cost of this is minimal due to the low price of tapes; however, its effect on transfer rates is very marked, and it reduces the storage capacity of a tape, usually 2,400 feet in length, which may lead to the file requiring further tape reels. The importance of this was discussed in Part 2.

Transfer rates specified are always maxima. They are reduced by the time taken to traverse inter-record gaps as shown in Figure 1. Note that, unless record sizes are large, the actual transfer rates will be much lower than the figures quoted by manufacturers. In addition, the curves given assume that a further tape read instruction is issued in time to avoid the tape drive mechanism stopping. If it does stop, the waste of time is greater.

For example, a Univac Uniservo 16 will traverse a gap in 5.0 milliseconds, but a physical start-stop will take 8.0 milliseconds. Corresponding figures for the Uniservo 20 are 5.0 and 3.0 milliseconds respectively.

The effect of record size on the length of tape required is the inverse of its effect on actual transfer rates. For example, if the actual transfer rate is 25% of the figure given by the manufacturer, the file will take up four times as much space on tape as it would do if there were no gaps at all.

Discs

Blocking records on disc can crucially affect performance, as has been stressed repeatedly in this series. Because of the many gaps introduced by multiple records on disc, larger blocks make better use of the available storage space.

The size of block chosen is important. Figure 2 shows the effect of block size on the data capacity of IBM's 3330 and 2314 discs. This makes it clear that it is vital to choose appropriate blocking factors, particularly for large blocks.

The manufacturers usually provide tables and formulae that the user can employ to estimate the effect of any given blocking factor chosen. Figure 2 emphasizes the meaning of these tables, and the user may find it helpful to construct one for his own devices.

Discs do not have a direct equivalent of the tape start-stop time, in that the gap between two records will be traversed in about 0.025-0.1 milliseconds, and the disc spins constantly, so avoiding stop-starts.

However, this very rapid transition from one record to the next makes it likely that the next record will be available before it is required; much of this series has concentrated on ways of avoiding or reducing loss of time as a result of this.

Choice of media

Usually the access requirements of the file will force the designer to a particular type of device, and he will mainly be involved in choosing correct blocking factors. Occasionally size is more important and this was discussed in Part 3.

The implications of the choice on actual transfer rate, storage space required (both in the CPU and on backing store) and system operation should be checked by referring to the data supplied by the manufacturer. Sensible use of the devices available will pay marked dividends in improved file performance.

THE AUTHOR: Owen Hanson is responsible for the MSc course in business systems analysis and design, and the Diploma of Systems Analysis at the City University Business School, London. He spent years in technical management and systems analysis before joining City University in 1970. He also acts as a consultant both in the UK and overseas.

Device	Head movement times (Milliseconds)			Rotational delay (Milliseconds)		Capacity (,000,000s of bytes)		Transfer rate (,000s bytes per second)
DISCS	Min	Average	Max	Average	Maximum	Disc	Module	
Medium (IBM 2314, ICL EDS 30, Univac 8414)	25	60	130	12.5	25	28-30	230 max	312
Large (IBM 3330, ICL EDS 100, Univac 8430, Honeywell MSU 0451, CDC 33301)	8-10	30	55-60	8.4	16.7	100	800	806
Very large (IBM 3340, 3350, ICL EDS 200, CDC 33302-11)	10	25-30	50-55	8.3-10.1	16.7-20.3	200-320	1600-2500	806-1198

MAGNETIC TAPES	Recording density (bytes per inch)	Inter-record gap (inches)	Start/stop (milliseconds)	Rewind time (seconds)	Transfer rate (1,000 bytes per second)
VARIOUS	556/800/1600	0.6	3-20	36-180	42-400

Table 1. The capabilities of a range of storage devices typical of those on the market.

Britain's Premier Exhibition of
COMPUTERS, PERIPHERALS, MICROPROCESSORS, TERMINALS AND SYSTEMS

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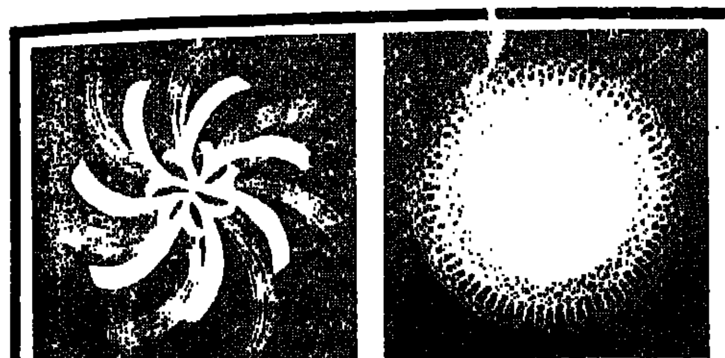

Some of the Laserium patterns.

F International's Steve Shirley offers a guide to the three laser entertainments currently showing in London, and says that they differ from each other as widely as the many applications to which lasers are now crucial. She is pictured right with her husband Derek — whose assistance in explaining "with his usual patience" the rudiments of holography, she acknowledges with thanks.

Tour of London laser lights

Lovelight, a laser musical: Metropole Theatre Victoria.
Laserium: London Planetarium, Marylebone Road.
Laser light circus: New London Theatre, Drury Lane.

FOLLOWING on the success of the Royal Academy's Light Fantastic exhibition earlier this year — to be repeated in 1978 — London suddenly has three concurrent laser entertainments. They differ from each other as widely as the many applications to which lasers are now crucial — brain surgery, industrial processes, navigation and communications, nuclear science, and so on.

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. Unlike any other form of light, whether sunlight or artificial, it is essentially monochromatic, coherent and capable of near perfect collination — with the sides of the beam remaining almost parallel rather than diverging.

Lasers can produce continuous light or short bursts lasting less than a millisecond. Conceived in 1958, it used to be a standing joke that the laser was an exciting development in search of an application. Holography is now one of a long list of laser applications. A hologram is a reconstruction of an object or scene as a complete three dimensional image. The recording is made on a light sensitive photographic plate which can then be viewed when illuminated with laser light. It differs from a photograph, an image in one plane only, in that a hologram gives a depth of scene in three dimensions. However, it is not merely stereoscopic: a stereo picture does not change with different viewing positions. For a hologram behaves like a real scene and the spatial relationships change when viewed from different angles ie, there are both horizontal and vertical parallax.

The multiple type of hologram — photographic information stored holographically by combining frames of film taken from each angle — yields either horizontal or vertical parallax depending on how the camera was panned round the subject.

For by altering the angle of reference to the plate for each recording, a hologram plate can store more than one image, each becoming visible and then disappearing from view when such a plate is rotated through the reference beam.

The complete converse also holds: each fraction of the plate holds the entire recorded image from its own viewpoint so that if a plate is broken any piece will still reconstruct the entire image when illuminated with the reference beam — though the perspective is limited. I first saw this demonstrated, with literally shattering dramatic effect, at IFIP in Edinburgh.

Holograms vary in size when viewed. Since every colour in the spectrum has a different wavelength, if an image is viewed by using the same colour light as employed for the recording, it will appear the same size as the subject. But if, say, the recording is made in the blue-green light of an Argon laser, the image will appear both larger than the original and nearer the plate when viewed in the red light of a Helium-Neon laser.

Dennis Gabor first conceived the theory of holography at Imperial College as recently as 1947. We are thus only just beginning to exploit holography (the film "Logan's Run" included a hologram of Michael York, for instance) but the UK should very shortly see orthoscopic Real Image holographic advertisements. I am told Courtaulds are likely to be the first, and even the ghost in Hamlet will soon be portrayed by holography.

THE METROPOLE

This poorly advertised show takes its name "Lovelight" from the theme song, which is probably the best thing in it. Immediately opposite Victoria station, a filmed show accompanied by overloud musical effects, traces psychedelically and with occasional snatches of breathtaking beauty, fast-moving images from the drawing board broken into four colours: red, green, blue and yellow. These are projected on to a massive aluminium saucer suspended vertically across the auditorium. Both the images and the music are fast and insistent. They are loosely linked into the story of Man from tribal primitive to space explorer — but if you lose the thread it really does not matter.

The technique employed was to start at the drawing board, then translate the drawings into electronic signals via a graphic computer system which records the signals onto magnetic tape which is then mixed and synchronised (not always entirely successfully) with the soundtrack for automatic playback.

This tape is then used to control the mirrors directing the laser beam on to the projection area so as to reconstruct the images for the audience. Most of the effects are pure abstract; others like the fish, tortoise and higher animals, including Man, are based on artists' drawings.

The far from smart theatre was poorly attended.

Summary: Children 8-14 would love this show. Monday to Saturday 2, 3.15, 4.45, 6.15, 7.45, 9.15 pm. Sunday 3.15, 4.45, 6.15, 7.45 pm. Tickets: Adults £1.25, children and pensioners 80p, school parties 70p plus one free pass for any adult accompanying 30 children.

THE LASERIUM

In complete contrast, the Laserium is presented in ideal conditions at the Planetarium with its air conditioning and specially designed seats for upward viewing. A large advertising budget and its prime position at Madame Tussauds by Baker Street station mean long queues unless you book ahead, since each house is filled to its 400-plus capacity.

The adult audience is young, silent, rapt. This is no filmed show but a reactive performance between the laser artists at a computerised console who project a collage of purely abstract colours choreographed to music on to the dome of the planetarium — sometimes plain, sometimes starred by the central Zeiss monster. During the classical parts of the concert, while the Blue Danube plays as if forever fresh, the images dance and swirl in delicious harmony; the abstracts (seemingly three dimensional though not in fact holographic) in complementing the Neptune theme from Holst's "The Planets" add a completely new dimension to the sensual experience. I found the synthesised rock and modern items imaginative and magnificent, especially in the Pulsar number, and yet without the same suspension of disbelief.

Summary: Forget the technicalities. Forget everything but the experience. Relaxing exhilarating experience not to be missed. Monday to Thursday 8.00 and 9.15 pm, Friday and Saturday 7.00, 8.15 and 9.30 pm, Sunday 7.00 and 8.15 pm. Tickets £1.50 on sale on the night but better to book up to two weeks in advance by personal application at the box office. The show is likely to be closed next February so telephone 01-486 2242 for booking enquiries.

NEW LONDON THEATRE

The third and only British laser show in London at the moment is presented by Holoco, the new enterprise whose directors are Nick Phillips, Anton First and John Wolff.

The opening of the Laser Light Circus has been much delayed because of the GLC checks and double checks for safety. Knowing that lasers are used for spot welding metals, one can understand the caution surrounding a show which could occasionally sweep the light across your face.

The main theatre has been converted into a circus ring some 20 yards across surrounded by a high plain wall and together with some two dozen others we were free to walk around within this arena or to just sit on the floor. The show, controlled by computer tapes, comprised synthetic music with a dazzling display of laser beams coming from several sources and reflected by two contra-rotating cuboid mirrors suspended centrally. This gave us a technically superb display of laser beams, sometimes with multi-colour effects, sometimes sweeping in broad arcs to form a latticework of light, sometimes swirling in Lissajous figures. For the first time, I was conscious of just how straight a straight line can be: just the particles in the air make the beams appear completely solid. For the first time I found physical, as opposed to mathematical, beauty in the projective geometry; but I also found the floor extremely hard. The 25 minute show, basically a technological show-off, in no way compares with the relaxed artistry of the Laserium.

The New Theatre is part of a centre, with restaurant, pleasant foyer and bar. After the show we looked at the exhibition of holograms, which included one of an unstable subject (ie of people).

Summary: Worth a visit if you are interested in lasers or holograms. Check by telephone (01-405 0072) how science is triumphing over bureaucracy before setting out otherwise, as on my first visit, you may find the theatre closed. Planned to be continuous from noon till 10 pm daily, it is currently only from 4 to 10 with the main show starting on the hour. Admission £1.20 (80p for children).

CONCLUSION

One can go to any of these shows just for fun, for the novel sensation, or as mere scientific curiosities. The Laserium is strangely relaxing and I cannot recommend it too strongly.

Busy senior executives can see one or two holographic marvels at F International's presentation suite at Datafair from October 4-6. Also the BCS Specialist Group for the Disabled will, among more serious demonstrations of the Optacon, which enables the blind to "read," a prototype MATE terminal and NPL's MAVIS, be doing computerised portraits in Datafair's Technology Corridor.

But as an artistic experience, there is nothing to beat the Laserium.

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Language translation by computer

By Walter Goshawke

WALTER GOSHAWKE, chairman of the British Computer Society Natural Language Translation Specialist Group, writes about the research which has been going on into language translation over the last two decades. So little has been achieved, that many people think the task an impossible one.

Are they right? By way of answer he describes his own fascination with languages and the work he has done in the field.

Goshawke adds, "I hope to do my researches during my retirement and I also hope to persuade others to take up the research, both in England and in other countries."

He hopes that many people will become sufficiently interested to tackle the research, and that language translation problems will, in due course, be featured regularly in the computer Press.

FOR two decades research has been going on with varying intensity into language translation by computer. So little has been achieved that many people think the task an impossible one. Are they right?

There is no doubt about the need for computer translation. Many periodicals appear regularly in two or more languages. Many others are translated into the local language by local linguists immediately on arrival from abroad. International conferences on all possible subjects are constantly occurring.

Above all, more and more products are being exported to more and more countries, involving more and more business correspondence between speakers of different languages. Powerful computers are readily accessible almost everywhere. If a satisfactory system of computer translation were in operation, it would constantly be in use.

Wherever there is an insistent need, research usually follows. About 20 years ago research began on a lavish scale into computer translation. Millions of dollars were being spent in the early days, but far less now. Very little success has been achieved, and this has resulted in a feeling of pessimism which is extremely widespread and extremely intense. Many computer people feel that computer translation is impossible and no further research into it can be justified.

I completely disagree with this view, and my reasons for saying so make a long story.

Ever since boyhood I have been fascinated by foreign languages. Almost every day of my life I spend some time either learning a new language or revising an old one. Like the crossword addict who must do a crossword every day, I have a similar sort of addiction for languages.

I remember pondering sadly that by the time of my retirement all the problems would have been solved without my aid. I was wrong, of course.

All aspects of languages fascinate me, but I particularly love the rich variety of ingenious, inconsistent and strange devices which make up the grammar of languages. A new language is always full of colourful surprises. In spite of this luxuriant variety I have always found that whatever I want to say can be said accurately in any language. It was inevitable that when I became interested in computers, translation was one of the things I thought of almost immediately.

In the early days of the British Computer Society and before, there was a great deal of talk of computer translation, and I always attended any meeting I could where it was being discussed.

There were a number of theories as to how it should be *done* and the prevalent feeling was one of optimism. I shared this optimism and would have dearly liked to start researching immediately.

However, that was impossible at the time and I remember pondering sadly that by the time of my retirement, then 20 years away, all the problems would have been solved without my aid. I was wrong, of course. I am now nearing retirement and there are still many problems.

I was also wrong in thinking I should have to wait so long before starting researching myself. Ten years ago, I started computer translation research as a hobby and I have pursued it ever since with the same sort of dedicated enthusiasm which some people give to bridge or chess. I have been allowed free computer time by a number of different business users to the extent of about ten minutes a week throughout the period, and I am most grateful.

I have always had as my first major objective the translation of business correspondence. I am employed in business and am familiar with business correspondence. Among its advantages from the research point of view, two are outstanding: the limited vocabulary and the relatively simple sentence structure. Another advantage is that in offices people are accustomed to modifying their procedures in order to make them more readily acceptable to computer operations. This is absolutely essential in language translation.

On the other hand, there are limitations. Programs and storage space used must be minimised and the results must be accurate. These and other considerations have led me to adopt an approach to computer translation different from that of other researchers.

Among the most far-reaching differences are: removal of ambiguities in input; universality; accuracy of definition of all details; stages of vocabulary and grades of difficulty.

Spoken languages abound with ambiguities of a number of kinds, most of which are resolved almost subconsciously in the human environment by an examination of the context. If unedited texts are presented to a computer for translation it means that the computer program will often have to examine the context to ascertain which of several possible meanings is intended. The examination of contexts by computer is a formidable task. It increases enormously not only the complexity and length of programs, but also the complexity and size of the dictionary necessary to be retained in store.

Moreover, the results can never be wholly relied upon. Idioms are the worst problem. Only idioms known to the programmer can be included in the program and there are many hundreds of them. In human speech and writing, new idioms are always occurring, and when first met with are frequently not understood. Thus programs for searching contexts can never be complete and reliable.

This type of programming cannot be contemplated for business correspondence. My programs do not examine contexts. If there is an ambiguity they either make an assumption and specify what it is, or produce an error legend and proceed with the translation.

All idioms except the commonest have to be rewritten in simple English before being processed. Thus the computer would make an assumption in the case of the sentence "I have written instructions," but "I have put this job to bed" would have to be re-written. In practice most business correspondence is unambiguous and simple in style, so this is not likely to be a problem.

For business correspondence it is necessary to have a system which is valid for all spoken languages. I have specially devised an intermediate language and the intention is that all messages shall be sent and received in it.

Moreover, all messages in the intermediate language are unambiguous, and the intermediate language version of the message, once despatched, becomes the official version. The same sets of programs are valid whatever the destination of the message sent out or whatever the source of the message received.

This system both reduces enormously the amount of programming necessary and minimises the educational needs of the programmer.

For business correspondence it is necessary to have a system which is valid for all spoken languages.

English, in common with other spoken languages, has many peculiarities which are not suitable for inclusion in an intermediate language. These peculiarities are used so often and have become so familiar that users do not think them peculiar at all. Nevertheless, the programmer must learn what they are and make allowance for them in his programs.

An example is the verb "catch". If you catch a bird, a mouse and a cat, you need only one verb. If you catch a train, a butterfly and a cold, you need three. Similarly, programmers in other countries have to know the peculiarities of their respective languages, and program accordingly.

Business correspondence must be accurate; otherwise it is useless. I have made accuracy in all details an important feature of my intermediate language. This language is called Number Language and consists entirely of groups of ten-digit units or NLunits. Most NLunits contain Number Language numbers or NLnumbers which have dictionary meanings such as man, book, office and so on. Each has to be defined accurately in all spoken languages using the system.

A word with two different meanings in English or in any other language must have two different NLnumbers to represent it in Number Language.

Other NLunits provide information about the nature and length of sentences, or indicate which of the NLunits represent the verb, the subject, the object of the sentence and so on. Thus a Number Language message can be translated accurately by *computer into any spoken* language for which efficient programs have been written for the purpose.

The dictionary is a very important element in the system. Apart from the fact that many words in any spoken language have a variety of different meanings, there is the problem that many words in spoken languages do not have exact equivalents in other languages.

This is why the Number Language version has to be the official version and why every NLnumber has to be defined in every spoken language. This means that sometimes an NLnumber can be expressed in one word in some spoken languages, but requires several words in others.

The creation of the dictionary is a very lengthy task and it is proposed to undertake it in stages, each of which will be clearly defined and numbered. The dictionary for business correspondence will be one of the early stages and will probably consist of between one and two thousand words.

The limitation of the vocabulary for any particular purpose reduces the scope for ambiguities and is very valuable. It also has the advantage that if users can identify which stage of vocabulary they and their correspondents are using, they can limit the storage necessary for the dictionary.

This does not, however, mean that rigid restriction of vocabulary must be practised in all circumstances. If on occasion additional words are necessary, a list of these can be appended to the message.

The writing of programs, too, is a lengthy task and it is also graded, in this case, according to difficulty.

This feature is particularly valuable for researchers. It enables them to know what stage they have reached compared with other users and researchers, and makes possible the exchange of messages in Number Language with other users at the same stage in other countries.

At all levels, accurate translations are obtained. Thus at a very early period researchers can exchange simple messages in simple languages with correspondents in other countries through computer translation.

Not only does this give readers to the research, but it also enables them to test simple programs in real life conditions before embarking on more complex ones.

So much for the important differences between my system and that of other researchers. Any reader who has followed me so far will want to know what success I have had. In my earliest programs, I used English, French, German, Italian and Norwegian languages as obtained accurate translations of simple sentences in all of them. The programs are no longer in existence, partly because I used a now obsolete programming language and partly because I have since introduced different programming techniques.

I have now produced a package which translates simply

All that is needed is more work on research, none of which is particularly difficult, but all of it very interesting.

English sentences into German. It is intended for the use of other researchers who want to study the system. The programs to only perform the translations but they also provide detailed explanations of all the programming methods. The programming language used is a very elementary subset of Cobol, which is easily learnt and is readily adaptable to any computer which uses Cobol.

I shall be pleased to supply anyone interested a copy of my unpublished paper* I have written which provides a description of the system and details of the package associated with it.

I hope to continue my researches during my retirement and this of course depends on being able to obtain free computer time. I also hope to persuade others to take up the research both in England and in other countries. It will then be possible to begin computer pen-friend correspondences with friends abroad.

Judging by the interest shown in the regular puzzle page of Computer Weekly, plenty of computer people seem to be willing to handle puzzles on computers on a variety of subjects, including mathematics, chess and playing card. Many others are interested in computer art.

So far, I have never seen any references to computer translation problems, of which a very rich variety exists. I am hoping that many people will become sufficiently interested to tackle them, and that language translation problems will, in due course, be featured regularly in the computer Press.

On the question of machine computer translation I would say my answer is yes. I feel that the system is flexible enough to deal accurately with much more complex statements than they are intended to be. I include no idioms which my programs cannot handle. What is needed is more work on research, none of which is particularly difficult, but all of it very interesting.

* Walter Goshawke, "Computer Translation of Business Correspondence", unpublished. Copies may be obtained free from the author at 4 Kew Road, Richmond, Surrey.

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Total system engineers the new elite

By C. E. Allen

THE recruitment and training of computer service engineers has taken on a new significance during the past few years as computer technology has been extended to simplify communications between man and machine and produce systems which can be used simultaneously by many people for diverse applications.

For the structure of the systems designed to meet these objectives is, in many ways, more complex than that of their predecessors and this necessitates changes in training to provide different skills.

The role of hardware and software in today's computer is not as clear-cut as it was in the early days and some functions previously controlled by one technique are now controlled by the other, or by a mixture of the two.

Additionally, due to miniaturisation of components and the use of micro-integrated circuit technology, it is possible to pack a very large number of circuits, and thus computer functions, into a single printed circuit board or unit.

Consequently, the days have gone when a hardware failure could be diagnosed by an engineer putting a test routine on to the central processor and by "stepping-through" to the failed unit.

Instead, error management and recording facilities are incorporated in the system software and the approach to the majority of failures is via software operating systems, using comprehensive suites of test and diagnostic programmes.

Thus the engineers engaged on resolving faults of this nature require a knowledge of the total system — not just its hardware components.

ICL's customer engineering division has recognised the need for service engineers with an understanding of the total computer system and the division's recruitment, training and career progression programmes are structured to meet this requirement.

In particular, ICL has recently set up a training and development scheme to produce engineers capable of diagnosing faults via the advanced operating systems employed on large 2900 machines.

A project team has been formed from the best fault-diagnosticians in the company who will set the required standards and work initially with product development staff to identify system characteristics which affect maintenance and serviceability. Lecturers from the division's training centre have been assigned to the team to assess training requirements at first hand.

Current implementation of the development programmes will ensure, in the future, much wider training on system architecture, software, hardware, micro-coding and operating systems.

The result will be a highly-trained and mobile group of system service engineers who will be capable of diagnosing complex system faults through the use of the customer's operating software.

Training plays an important role in the career progression of all ICL customer service engineers, of whom there are now more than 6,000 worldwide. Here C. E. Allen, manager, Customer Engineering Division Training at ICL, describes the company's training scheme, and says that, by dedication and hard work, junior entrants can become the total systems engineers of tomorrow, and join the new elite of the computer servicing industry.

Training plays an important role in the career progression of all ICL customer service engineers who now number more than 6,000 worldwide.

Although some courses are designed so that they can be undertaken by engineers while working in their own region, most of the training is provided at the division's extensive training centre at Letchworth which employs more than 80 lecturers and 30 development staff and operates on a budget of £2 million a year.

Because of recent expansion in ICL's overseas operations, around 30% of those attending courses at Letchworth now come from abroad. Additionally, lecturers are travelling overseas to give courses to service engineers in their own countries.

More than 20,000 student weeks of training is provided annually. Over 40% of this is devoted to ongoing training for existing service engineers according to their skills and ambitions, one-third of it covers training in new systems, new products and modifications to existing ones and changes in maintenance technology, and one-quarter relates to the training of new entrants.

The continuation training for existing engineers is designed to enable them to gain proficiency on a greater number of computer devices, to progress to the more complex parts of the computer system where sophisticated test equipment and fault-diagnostic techniques are used and some of these engineers will eventually take responsibility for the maintenance and repair of major computer systems in use on customers' premises.

Close liaison with engineering management in the field and practical experience gained over many years has led to the development of a modular training scheme.

Each module is of no more than eight weeks' duration and is run at regular intervals to a planned schedule which is made known to all ICL customer engineering departments throughout the world.

There is a high practical content in all courses undertaken at the training centre which is equipped with computer systems worth approximately £2,500,000. These are continually taken apart, re-assembled and run by students trying out the new skills they are obtaining.

With ICL's products now being sold in 80 countries, there is an increasing requirement for trained service engineers. Consequently the company recruits personnel at several levels. They include existing service engineers, ex-servicemen with relevant experience, and engineering graduates direct from university.

Junior entrants with "O" level qualifications in mathematics and scientific subjects are taken in each year on a four-years sponsored training programme which leads to City & Guilds qualifications in computer technology.

The theoretical side of the course is undertaken at the Stevenage College of Further Education while the practical experience is gained at the Letchworth training centre and by spending time in ICL factories and service departments. The Engineering Industry Training Board sponsors the course and exercises a strong influence on course content.

By dedication and hard work the junior entrants of today can become the total systems engineers of tomorrow and join the new elite of the computer servicing industry.

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Candidates must have a commercial background in finance, accounting or payroll. Analysts should have some experience in finance planning and programmers must have at least two years of COBOL on a large machine.

Above average salaries and opportunities.

Contact: Jim Baker

Analysts and Programmers

London **up to £6000**

Our client, part of a large well-known group, has vacancies for Analysts and Programmers to work on the development of real-time systems using new techniques and hardware.

Senior Analysts and Analysts must have several years experience in commercial applications, such as accounting or merchandising, and be capable of controlling project teams.

Programmers and Senior Programmers must have at least two years using COBOL in an IBM installation.

The future d.p. plans include challenging developments which can offer attractive careers.

Salaries negotiable according to experience. Generous fringe benefits.

Contact: Jim Baker

Programming Team Leaders

Surrey **Neg. to £5000**

Applications are invited for the above posts from persons who consider they can make a worthwhile contribution in a professional team environment. The positions require the ability to supervise and control the work of programmers and designers in the development, implementation and support of commercial packages. Candidates should have at least three years' COBOL programming background and preferably with some supervisory experience.

Excellent working conditions. Salaries in relation to experience.

Contact: Margaret Stevens

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

TRIAD Computing Systems Limited — Guildford

TRIAD continues to expand. Our London operation has been growing larger. We are now starting our first out-of-London operation in Guildford which will be managed by Dr. Keith McKenzie. We are therefore looking for high quality people to form a nucleus for this group. We also require more people to be based in our London office.

We have already made our name in minicomputer systems. We are also building up a solid business in microprocessor systems – hardware and software – primarily in industrial automation. Our European involvement is growing profitably. Less headline catching is our continuing work in commercial systems, mainframe program development, hardware selection and high level consultancy.

GUILDFORD

Early project work will include:

- database development
- text handling
- linguistic programming
- control and application software for mini and microcomputers

THE COMPANY

Continuing requirements include:

- commercial systems designers — up to £6,500
- experienced project leaders — up to £6,500
- competent programmers willing to exploit their talents in a structured environment — up to £4,500
- specialist consultants in appropriate areas — up to £7,000

THE BENEFITS

What we are offering is:

- challenging work
- relevant training
- early responsibility
- bonus
- travel loans

Write, or ring: Erwin Schneider

TRIAD Computing Systems Limited, 1 Dorset Buildings, Salisbury Square, London EC4Y 8ES. 01-353 6323

Associated Operations in Belgium, France, Germany, Italy and Switzerland

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CITY OF DERBY

Principal Computer Assistant

Grade P.O.1(3) £5,512-£6,097
including £520 salary supplement

The successful candidate will be required to control and develop the systems and programming function in respect of new and existing applications from identifying users' requirements to successful implementation and maintenance.

The duties include preparation of reports for Management Team and will involve deputising for the computer manager in his absence.

Wide systems and programming experience is required, preferably on ICL machines and in local government, together with a relevant professional qualification.

The Council operates a 48k ICL 1902S installation running extensive real-time local and remote V.D.U. based systems.

Generous resettlement expenses will be paid in appropriate cases.

Application forms and further details may be obtained from the City Treasurer, Council House, Corporation Street, Derby DE1 2FE. (Derby 31111, ext. 818 or 828). Closing date Friday, 9th September, 1977.

Ashford Borough Council

Systems Analyst/Programmer

required in a unit operating an ICL 2903 with discs and tapes on behalf of Ashford Borough Council and Shepway District Council.

A minimum of 18 months' practical experience in COBOL is essential with a knowledge of PLAN an additional advantage. Systems training will be provided if necessary.

Salary £3825 to £4095 plus supplements of £312 plus 5%,

Excellent conditions of service including:—

- 100% removal expenses
- settling-in allowance
- council accommodation or assistance with professional fees for house purchase in appropriate cases,

Application form and job description obtainable from the Chief Personnel Officer, 14/16 Church Road, Ashford, Kent, tel. no. Ashford 24411, ext. 244, returnable by 19th September, 1977.

Chief Programmer

New Applications

New IBM 370/158 Installation

Our client, an extensive user of IBM hardware and software, wishes to recruit an experienced DP programming professional to be responsible for providing depth technical expertise, effort and advice in the development and implementation of wide ranging systems utilising advanced techniques and methodologies. This is a new appointment reporting to the Manager, Technical Support and Advanced Systems.

The successful applicant will spearhead technical design thinking on a broad applications front. A quality essential to this appointment will be the ability to objectively advise your peers on the benefits, implications and merits or otherwise of the introduction of relevant technical concepts and procedures.

You are probably around 30 years of age, possess a sound background of experience in applications software design, development and implementation in an IBM 370, OS, VS, mixed high level commercial language environment. Experience in interactive program testing would be advantageous.

The group offers security via the nature of its expanding business activities, attractive fringe benefits, significant career prospects in line with long term development plans, and an opportunity for occasional travel to the continent. An attractive starting salary will be negotiable and it is unlikely that applicants currently earning less than £[illegible] p.a. would possess the level of experience required. The location is in the Northern Home Counties rural area, with easy access to London (1 hour). Relocation expenses are negotiable and the area offers an excellent choice of schools, recreational facilities and medium priced housing.

Applicants, male or female, should telephone or write for further details, in strict confidence, quoting Reference Number C1478, to Tony Spurr, at the address below.

BIS Applied Systems Limited
79-80 Blackfriars Road London SE1 8HB
Telephone 01-928 9511

BIS Applied Systems

THE UNIVERSITY OF SHEFFIELD

DEPARTMENT OF ELECTRONIC AND ELECTRICAL ENGINEERING

Applications are invited from men and women for the post of Programmer in the above Department, tenable for 6 months and sponsored by the Nuffield Foundation. The person appointed will be required to work on the development of Computer-Based Assessment Programs for first year electronic and electrical engineering under-graduates. Applicants should be graduates with experience in computing and preferably a background in electronic or electrical engineering or physics. An interest in educational research would also be beneficial. Salary on OR Grade IB, up to £3333 p.a.

Particulars of the post from Dr. Keith Barker, Department of Electronic and Electrical Engineering, The University, Mappin Street, Sheffield, S1 3JD, to whom applications (1 copy) quoting the names of two referees should be sent by 23 September, 1977. Quote Ref. R.21/B.

DATA PROCESSING MANAGER

To be responsible for the operations and implementation of all activities on our I.B.M. System 3, Model 12. Applicants should have at least three years' previous experience in D.P. Management in which their responsibilities should have covered the implementation and specifications of major new systems. Experience of direct data entry operations via V.D.U.s would be advantageous.

It is envisaged that salary will be attractive to the right applicants but it is unlikely that anyone earning less than £5,500 per annum will have the relevant experience.

If you wish to apply for this vacancy, please contact **Mr. A. Tucker, Personnel Manager,** who will be happy to send you an application form.

INTERNATIONAL RECTIFIER
HURST GREEN, OXTED,
SURREY RH8 9BB
Telephone: OXTED 3215
IOR

DatasolveDatasolve

An expanding city operations environment

BOC Datasolve, a leading computer services bureau with installations throughout the country, is seeking additional experienced Operations Personnel to join the ICL sector of its London City Data centre. This is an important and high potential area of the company's operations and a bright future lies ahead for both men and women, especially as further installation of the 2900 range is planned.

Technical Support Officer

Applicants must have a good knowledge of ICL 1900 Software, a background in 1900 Operations, and a knowledge of George 2/2+. Preference will be given to those applicants with experience in Cobol/Plan, Communications, and 1900 packages.

Important aspects of the job are:

- Control of software maintenance;
- Development and amendment of macros;
- Maintenance of George 2+ operating system; and
- Interface with software development.

Senior Computer Operators

Applicants should have at least 18 months' experience in an ICL multi-processing environment, with a working knowledge of George 2/2+. A four-shift system is in operation, and there are excellent promotion prospects.

All appointments carry competitive salaries and an attractive benefits package. Write with personal and career details to J. P. Bayley, Personnel Officer.

BOC Datasolve

BOC Datasolve Limited,
88 Old Street,
London EC1V 9PX.

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BOROUGH TREASURER'S DEPARTMENT

Programmer

Up to £4,500 p.a. inc.

We need a Programmer, with at least two years' COBOL experience, to join our Systems and Programming Division, using modular programming and GEORGE 2+. The successful applicant will be in the Planning and Technical Services team, and will be involved in new areas of development.

Opportunities exist for an ambitious person to gain experience in the Systems field.

36-hour, 5-day week, with flexitime in operation.

Application form and job description from Personnel Officer, Town Hall, Forest Road, London E17 4JF. (Tel. 01-531 8899, 24-hour answering service).

Closing date: 16th September, 1977

Please quote Ref. B.554

London Borough of Waltham Forest

DATA PROCESSING MANAGER

We are a leading multiple retail organisation based in central Woking and as a result of considerable expansion we shall be installing an ICL 2903 later this year. In 1971 we were trading from 177 branches and we are now trading from 370 branches throughout England and Wales. We anticipate that expansion will continue at the same rate.

We wish to recruit a manager for the installation immediately in order that the successful candidate can become fully conversant with the present system and be totally involved in the introduction and operation of a new in-house installation.

Previous experience on a 2903 installation together with a sound knowledge of commercial systems, project management and the implementation of new system is essential

SALARY circa £5,000
Contributory Pension Scheme
4 weeks annual holiday

Please write giving details of current employment and previous experience to:

Irene Foster
NSS Newsagents Ltd.
Ryde House
Chobham Road
Woking GU21 1JQ

COMMUNICATIONS

370 PLI + Assm. MICROPROCESSOR SOFTWARE

PRINCIPAL PROGRAMMER — **to £6000**
SENIOR PROGRAMMER — **to £5000**

KENT **FULL RELOCATION EXPENSES**

Are you interested in joining one of the most advanced communications projects in the world?

Our client, a world leader in telecomms systems, is just starting a project to develop a major new product. The system is based on multiple microprocessors and the control software is to be produced using a highly intelligent software generation system running on IBM 370s.

A **Principal Programmer** is required to lead a small team and take responsibility for a sub-project. He will develop a simulator for the microprocessors to test the software on the 370s. The person required must have good 370 knowledge and preferably experience in PL/I or Assembler. Knowledge of simulators or RT systems would be useful.

A **Senior Programmer** with some PL/I or Assembler experience is also required to work on this exciting project.

Experience gained in this environment will be applicable to major communications systems throughout the world. There are excellent career prospects and an extensive product development programme in this multinational software development centre.

RW 35/1

hutchinson-scoggins recruitment
10 Dover Street London W1X 3PH Telephone 01-499 4501

LONDON BOROUGH OF ENFIELD

Senior Systems Analyst

£5494-£6055

Applications are invited for this post in the Borough Treasurer's department. Applicants should have a sound background in programming and systems analysis and some years experience in Local Government or commercial data processing.

Application forms are obtainable, upon receipt of a foolscap s.a.e., from the Borough Treasurer, P.O. Box 54, Civic Centre, Silver Street, Enfield, EN1 3XF. Closing date 16th September, 1977. Please quote reference ORA/994.

NORTH WEST THAMES REGIONAL HEALTH AUTHORITY

COMPUTER CENTRE

PROGRAMMER

Required to work on Hospital Activity Analysis and other Applications. A minimum of 1 year's programming experience, preferably in ICL Cobol is desirable, but conversion training would be given to suitable candidates.

The Computer Centre is an attractive modern building standing in its own grounds in New Southgate and the equipment used is an ICL 1904S with communications facilities.

Salary Scale: (Senior Administrative Assistant Grade) £3,634-£4,844 per annum plus £354 per annum London Weighting. Earnings Supplement Stage I of £312 per annum and Stage II of £208 per annum are payable in addition.

Application forms and further particulars obtainable from the Regional Personnel Officer, North West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3QR (Telephone No. 01-262 8011, Ext. No. 261) quoting reference number 192. Closing date 15 September, 1977.

"EXCITING SYSTEMS OPPORTUNITY"

SOUTH MIDLANDS SYSTEMS ANALYST

SALARY CIRCA £3,850 P.A.

A National Manufacturing concern is presently involved in the implementation of a recognised package to standardise payroll procedures. They are currently undertaking some of the most sophisticated systems development within the UK utilising both large IBM 370 series mainframes and mini hardware.

Our client is seeking a Systems Analyst to work within the Central Payroll Section which is the focus for other Payroll Sections within the UK, providing a source of expertise and control in the process of standardisation, centralisation and maintenance of payroll systems.

Interested applicants should have:—

ESSENTIALLY

* at least three years' systems analysis experience, some of this time to have been spent ideally on payroll applications
* a degree of equivalent qualification
* a proven record of success in handling projects from feasibility through to implementation within a large organisation.

PREFERABLY

* a detailed knowledge of UNIPAY
* a programming knowledge (ASSEMBLER).

This is an excellent opportunity for a Systems Analyst to become involved in a position of interest and responsibility within the areas of payroll and payroll related systems.

Excellent fringe benefits are what you would expect from a large major manufacturing concern and include a recently updated pension scheme, and facilities for car purchase at extremely advantageous terms.

CONTACT REG HEATH ON: 021-236 3781 REF. NO. 77/09/4

REAL-TIME DEVELOPMENT

WEST LONDON

ANALYST/PROGRAMMERS & PROGRAMMERS

SALARY TO £5,500 P.A.

Our client is shortly to install recently released current generation hardware to service, through this central location, its UK operating companies.

There is a substantial development work-load to incorporate the use of on-line facilities and these positions will appeal to those persons wishing to play a key role in a small developing installation in a newly formed team of Data Processing Professionals.

You must have:—

* good COBOL experience
* commercial systems understanding
* Analyst/Programmers will enjoy a balanced systems/Programming job content.

All these positions carry annual bonus, profit-sharing and other useful benefits.

CONTACT LONDON OFFICE: 01-935 0671 REF. NO. 77/9/5

SCR

BEDFORDSHIRE

REAL TIME SYSTEMS

SALARIES TO £5,400

Our Bedfordshire based client serves a group of companies. They have centralised their computing activities around a large IBM 370 series mainframe using CICS teleprocessing for real-time development.

This has created capacity for further extending its data processing work. They therefore need to recruit additional key systems analysts who will be involved in major projects. These include an on-line booking system, stock control/movement and comprehensive accounting systems.

Candidates should have:—

* An analytical approach to problem solving.
* Preferably some experience of systems design, having worked in an Analyst Programming role.
* The ability to communicate effectively with all levels of management.
* A commitment to data processing, a real desire to move into systems analysis and be involved in the business.

There are excellent promotional opportunities to advance to senior systems positions, with salaries in excess of £5,400 p.a.

The company offers FLEXITIME, EXCELLENT WORKING CONDITIONS, FREE LIFE ASSURANCE and RELOCATION ASSISTANCE.

Make a move in the right direction and contact:

ROD BEESON On 021-236 3781 REF. 77/09/6

SCOTLAND & MANCHESTER

SALES EXECUTIVES

Base salary c6k
Quota earnings 12k
+ Company car

Our Client is an International Company with a large, well-established customer base in the North of England and in Scotland. The product range covers key-to-disk, shared-logic word processing, and distributive processing systems. The products are noted for their technical excellence, and have been well accepted.

The Company is launching a fresh sales effort in the ascribed areas, and requires two mature, experienced sales professionals to develop its existing customer base, and to promote new business sales.

Candidates must have:

* good sales experience and attendant success in the areas of at least one of the following:
  key-to-disk
  shared logic word processing
  distributive computer systems
* a high level of technical self-sufficiency
* a current real understanding of the geographic markets defined.

These are unique opportunities for high earnings in a situation with enormous scope for a sales professional who wishes to join a Company on a major re-launch programme.

CONTACT: REF: 77/09/4

DAVID WADE on:
021-236 3781

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

Computer Operator

£2,724-£3,450 + Shift Allowance and appropriate supplement under Phase 2 of the Government's Pay Policy

The London Borough of Merton requires an additional operator for its computer installation at the Town Hall, SW19 (adjacent to Wimbledon Station).

The configuration comprises a 64K 1902T with communications. A shift system is in operation spanning the period 0700-2200 hours Monday to Friday with occasional overtime including weekends. Shift arrangements are subject to review. The successful applicant will be appointed within the salary stated according to experience.

Legal and removal expenses in appropriate cases, loans for annual season ticket and generous holiday entitlement.

Application forms from Borough Treasurer, Town Hall, Wimbledon, SW19. Tel. 01-946 8070, Ext. 328.

CLOSING DATE: 16th September.

SYSTEMS ANALYSTS

to £8,000

An established firm of management consultants, members of the Management Consultants Association, needs additional computer people with a good commercial systems background.

Assignments are varied and interesting and cover a wide range of industries and applications. There is the opportunity to travel, to develop skills and experience and to work with consultants of varying disciplines.

Candidates should have a degree or comparable professional qualification and be aged 28-35. In addition to a good salary and range of other benefits the positions offer an excellent opportunity for career development.

Please apply Box No. 1886, Computer Weekly

COUNTY OF CLEVELAND

COMPUTER SERVICES UNIT
DEPUTY COMPUTER OPERATIONS MANAGER

£5209-£5512 (includes supplements)

A Deputy Computer Operations Manger is required for the County Computer Services Unit. This is a very responsible post, having management responsibilities for a considerable number of staff. The central computer is an IBM 370/145 which is connected to a large terminal network for batch and direct enquiry operations.

Applicants must have experience appropriate to the job.

Application forms may be obtained from the Director of Computer Services, Reed House, Corporation Road, Middlesbrough, Cleveland, to whom they should be returned by 16th September, 1977.

SENIOR SYSTEMS ANALYST
BOURNEMOUTH AREA

An exciting opportunity has arisen for an experienced computer professional to play a leading role in the development and implementation of a range of data processing systems to aid the automation of our company's internal business processes.

Membrain is a young, rapidly developing company, engaged in the design and manufacture of highly sophisticated Automatic Test Equipment for use within the electronics industry.

This is a challenging opportunity offering considerable scope for career advancement. Education: probably to degree standard or equivalent. Several years systems experience in a manufacturing industry is also essential, preferably involving production of materials control. Additionally, some O&M experience would be an advantage.

Our long-term objective is the development of an integrated system covering the company's major business procedures, based on an in-house mini-computer. Direct experience in this area would therefore be a further advantage.

In addition to a highly competitive salary, we offer a number of company benefits. Relocation costs will be reimbursed where appropriate, to assist you in moving to this attractive area, close to the amenities to Bournemouth.

Why not telephone Donald Crawford now, on Ferndown (0202) 893535. Or write him a brief note requesting further information and application form.

Membrain Limited
Ferndown Industrial Estate
Wimborne, Dorset BH21 7PE

MEMBRAIN
European leaders in Automatic testing

Systems Programmer

With the recent installation of our new Honeywell 62/40 we are looking towards strengthening our well established data processing team.

Candidates should have had at least two years experience with a disc based computer system.

An attractive salary will be offered plus all the benefits associated with a major international company.

For further details please contact Mr. R. G. Martin, Data Processing Manager, AEG Telefunken (UK) Ltd, Bath Road, Slough, Berks Tel: Slough 872622.

AEG-TELEFUNKEN (UK) LTD

Eaton Limited, manufacturers of Yale Fork Lift Trucks have the following vacancies

Senior Systems Analyst

£5,000 INCL COLA AND THRESHOLD

Good commercial background, able to liaise with top management. Will be heavily involved in the modification or re-design of current systems, due to a scheduled change of hardware which will necessitate changes to systems philosophy.
Current configuration system 3 on line to IBM 370/158
Planned configuration IBM 3790 on line to IBM 370/158

Senior Programmer

£4,600 INCL COLA AND THRESHOLD

3 years' cobol essential. Knowledge of J.C.L and teleprocessing using IBM 370 would be of advantage.
Will be based at the division programming for 370 at the computer centre and the system 3 at the division. The latter to be replaced by an IBM 3790

Data Processing and Controls Supervisor

£3,600 INCL COLA AND THRESHOLD

To be responsible for data preparation department and computer department. Will be required to liaise with users and maintain standards of operating and data entry. Experience essential.

Please write or telephone for application forms to:

Personnel Manager, Eaton Limited, Materials Handling Division, Waddens Brook Lane, Wednesfield, Wolverhampton WV11 3SW

Telephone: Willenhall (0902) 66955

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IBM OS JCL
London

Phone 01-439 6481
(24 hours)
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Personnel Consultants

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SALARIES
34, Percy St.
637 5551

MINICOMPUTER PROFESSIONALS

West London £5,000

Our client needs a person capable of taking charge of a minicomputer to be installed early next year.

With the backing of group specialists and a software house you would need to be able to:

Assist in installation planning
Set up files
Set up procedures and controls
Supervise routine operation
Train hands-on VDU users

You would also be expected to spend a couple of months learning about warehousing and distribution.

If you can tackle this challenging and responsible job it could be your career take-off point.

Send career details to **David Torvell** at our London office, quoting reference DT/348.

Ivor Norton
Management Services Ltd
P.O. Box 63, Copthall Tower House, Harrogate, HG1 1TS. Tel: Harrogate 66628.
85/87 Jermyn Street, London, SW1Y 6JD. Tel: 01-930 6851.

Distributed Processing Development

£4,000-£7,500 p.a. + mortgage subsidy

The London development centre and Bristol computer installation of

Schroder Computer Services Limited

are now well established, with the IBM 370/148 computer, one of the first in the UK, fully operational.

The machine works under VM with CMS, to provide distributed processing facilities to group and external clients via a variety of terminals, with on-line program development for the London centre.

The considerable expansion has created opportunities in the customer services and development departments for further people with relevant DP experience:—

Consultants — 1 each London and Bristol — Up to £7,500
The posts embrace the important roles of client liaison, marketing support, project auditing and management/systems consultancy. Applicants must be able to demonstrate significant success in a similar function.

Systems Analysts — London — Up to £6,500
A number of opportunities have been created up to Senior level within the development group on a wide variety of applications, with emphasis on commercial, investment and stockbroking systems. A proven background in programming and analysis is required and IBM involvement desirable.

Analyst/Programmer—Customer Support—London — Up to £5,500
The company expansion has created the need for a person to support commercial systems and liaise between clients, sales and technical departments — a varied and interesting job to suit the person who has a sound understanding of overall programming and systems concepts.

Programmers — London — £4,000-£5,500
There is a wide variety of projects for programmers and we would like to discuss the opportunities with you if you have 1-4 years' practical experience which must include IBM ASSEMBLER, with COBOL knowledge useful.

These positions represent excellent opportunities with a sound and reputable group, having a high regard for employee welfare, offering generous benefits, including 50p LVs, season ticket loans, flexible mortgage subsidy and excellent non-contributory pension scheme.

The opportunities are exceptional and you should telephone our CROYDON Office to discuss them in more detail, please quote ref: CW54-78.

01-686 9693 (24 HOUR ANSAPHONE)
19 PARKER STREET, CROYDON, CR9 1TN

061-236 2419 FAULKNER HOUSE
FAULKNER STREET, MANCHESTER, M1 4YD

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS
CAPP ASSOCIATES
LONDON AND MANCHESTER
Computing Services Association

Greater Glasgow Health Board

SYSTEMS DESIGNER

Salary Scale: £4000-£4985 + £620 flat rate supplements

Applications are invited for the above post within the Board's Computer Applications Unit. Candidates should have a good knowledge of systems design and the ability to supervise staff working in FORTRAN/PLAN.

Application form and further details may be obtained from the Personnel Officer, Greater Glasgow Health Board, 351 Sauchiehall Street, Glasgow G2 3HT, to whom completed forms should be returned by Wednesday 31 August.

Freelance Experienced PLAN Programmer

Romford, Essex

£165 per week

Must have experience of George 3 operating systems and PLAN programming. Required immediately for 3 months' contract with possible option of monthly renewal.

Apply in first instance to M. Dadlani, Austin Knight Ltd, 20 Soho Square, London W1A 1DS

QUEEN MARY COLLEGE
University of London

COMPUTER CENTRE USER DOCUMENTATION

Applications are invited from graduates with computer experience and the ability to write clearly and concisely. The successful candidate will be responsible for writing user documentation describing both the services available to computer users and how to use them. The Centre currently provides a large multi-access service on twin ICL 1904S's for both research and teaching throughout the University of London. An ICL 2980 is expected to be installed and a major part of the documentation produced will be for the services developed on this new computer.

Salary in range £2904-£4811 per annum, plus £450 London Allowance. Applicants should write giving full details (including the names and addresses of two referees) to The Registrar (CW), Queen Mary College, Mile End Road, London E1 4NS.

ANGLIAN COMPUTER SERVICES

SPECIAL ANNOUNCEMENT

With immediate effect Anglian Computer Services becomes:

ANGLIAN D.P. SERVICES LTD.

Due to expansion, we have found it necessary to change our company name and relocate to larger offices.

We have many vacancies for computer staff on our books. We are particularly looking for people with ASSEMBLER and COBOL experience to work in Norfolk or Suffolk.

For further details ring Steve Tumbridge on Danbury 4255 (STD 024 541).

Our new address and telephone number is:

ANGLIAN D.P. SERVICES LTD.
Stratford House, Maldon Road
Danbury, Chelmsford CM3 4QW
Tel: Danbury 4255 (STD 024 541)

Software Engineering Analysts and Programmers

For a new project team exploiting Europe's foremost Communication Equipment.
£4,000–£14,000

Based London/Europe

Our Client is a major British and International Force in the field of Electronic Telecommunication. Traditionally market leaders, by sales and innovation, they are now putting together a multi disciplined team to develop and exploit internationally an advanced range of processor controlled exchange equipment. The team will work initially between London and Western Europe but sales will be directed throughout the world.

The Software Engineers will be dedicated to the design, documentation, simulation and testing of software systems applied to processor controlled telephone exchange equipment. The work will involve the use of structured programming and specialised high level language together with simulation to ensure the necessary standard of performance.

Candidates will be from a variety of backgrounds. As Group Leaders they will have had real time programming and system analysis experience related to telephone or similar equipment. At the other end of the scale, training is available to cover the specialised aspects of engineering design for SPC systems and can be given to develop those with lesser experience.

Salary is negotiable and will reflect ability, experience and location. Benefits are excellent.

Applicants, men or women, should apply in strict confidence to P. M. Small, who is advising the Company, quoting Ref: 547/CW and stating experience, age, qualifications and present salary to:

CB-Linnell Limited
8 Oxford Street, Nottingham.
MANAGEMENT SELECTION CONSULTANTS
NOTTINGHAM · LONDON.

Technical Project Leader

HAWKER SIDDELEY AVIATION

Throughout the Company, teams of specialists are currently incorporating the effects of advanced computing techniques in the development of new aircraft design systems for the 1980s.

A Project Leader is required to head a team of technical analysts specialising in all aspects of aircraft structures, current priorities being in the fields of weights and geometry, and with additional responsibility for graphics systems.

A minimum of three years' experience in a supervisory capacity, together with a degree in Maths, Computer Science or Engineering, are essential.

Salary will be commensurate with the seniority of the position, and facilities are all you would expect from a leading organisation.

Please write or telephone for an application form quoting CW/41 to:

The Personnel Officer
HAWKER SIDDELEY AVIATION LIMITED
Richmond Road, Kingston-upon-Thames,
Surrey KT2 5QS.
Telephone: 01-546 7741

BRITISH AEROSPACE

PROGRAMMER/ ANALYST

Liverpool

Owen Owen is a rapidly expanding Departmental Stores Group with its H.Q. based in Liverpool.

They are seeking to recruit an experienced programmer/analyst for a medium-sized computer department.

A minimum of 12 months relevant experience is essential. The hardware includes a Honeywell 64/20 with disks and tapes, using Cobol language.

Applications cover the whole range of activities of the company.

An attractive salary will be offered together with a range of fringe benefits.

Telephone:
Margaret Donaldson
on 051-227 4111
Ext 540

owen owen

PER PROFESSIONAL and EXECUTIVE RECRUITMENT

This vacancy is open to male or female candidates

QRH

Computer Recruitment

MANCHESTER/CHESHIRE

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Candidates should have gained a minimum of four years' real experience using COBOL in a commercial environment. We demand a high degree of technical competence and professionalism from our Technical Staff. In return we offer an opportunity to make a real contribution, and to grow within a dynamic and stimulating environment where talent and initiative are both recognised and rewarded.

In addition we offer competitive salaries, a comprehensive benefit package and air fare to Canada for successful applicants and immediate dependents.

Preliminary interviews will be held in London throughout September. Applicants are invited to forward complete résumé in strict confidence to:

Dept. 131, Government of Ontario,
Selective Placement Services,
Ontario House, 13 Charles II Street, London SW1Y 4QS.

1900 Operator Training Opportunities

£3300-£4600 Windsor

Are you an experienced 1900 Operator? Have you ever considered progressing out of operating to use your knowledge and experience in training others?

We would like to hear from you if you have:–

- the ability to communicate clearly
- at least 2 years' experience as a 1900 Operator
- in-depth knowledge of 1900 hardware and Manual Executive
- knowledge of GEORGE 2 or 3
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The job involves lecturing to experienced Operators on a range of courses including advanced 1900 operating, GEORGE 1/2 operating and advanced GEORGE 3 operating. Once established as an authority on 1900 Operating Systems, your career opportunities will include moving on to 2900 VME/B and VME/K.

You will be based at our training centre in Old Windsor, Berkshire. Your initial training will include teaching techniques, followed by attending the courses you will be expected to take. The starting salary is negotiable depending on previous experience.

Please contact Mary Ann Bourne, Assistant Personnel Officer, ICL, Beaumont, Old Windsor, Berkshire, SL4 2JP. Telephone Windsor 56181. *Please quote reference CW1506.*

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ICL

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We need

- *software specialists to work within application groups on small business interactive systems.*
- *specialists to work on micro-processor projects for new hardware prototypes.*
- *responsible personnel capable of working without detailed supervision.*

You need

- minimum of four years' proven programming experience in assembler languages, BASIC or PL-1 on small business systems, mini-computers or micro-processors.
- to be self-motivated and have worked on computers in a commercial environment.
- to have worked on micro-processors, software development for a manufacturer, or data transmission experience would be an advantage.

Applications, including c.v. in writing to:
Mrs. B. Aiken
Holland Automation International (UK) Limited
457a & 459 Bath Road
Cippenham, SLOUGH SL1 6AA, Berks.
or telephone for Application Form—Burnham (062 86) 65232/3.

Holland Automation International

Our method

- all employees are shareholders.
- all shareholders are employees.
- only method of operating a successful software house is with enthusiastic highly motivated staff who are given responsibility and a high degree of involvement in the Company.
- provision of a strong bond between employees and the Company.

We offer

- *work on variety of projects on latest up to date interactive systems and micro-processors.*
- *good working environment with enthusiastic motivated personnel aiming to produce good quality software.*
- *good competitive salary up to £6,500 dependent upon experience plus bonus participation based upon performance.*
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Datascene can get you that better job. And we like to think that once we've found it for you, you'll stay. So we don't look forward to seeing you again — for a long, long time.
We've got vacancies on IBM, ICL, HONEYWELL and UNIVAC plus a few on machines you've probably never heard of. Using disciplines and languages that you're either familiar with or are unknown.
Earnings? Around £2750-£4100, depending on what you know. Or what you can learn.
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Plus Staff Mortgage!

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They are a financial institution who are currently developing a real-time system using the latest generation of intelligent terminals.

So, for big company benefits, unlimited career prospects and a mortgage that is nearly painless, ring TODAY.

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MINI ASSEMBLER	**NIXDORF**
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Operators with experience on IBM, UNIVAC, HONEYWELL, BURROUGHS, NCR, ICL, DEC & PDP are required NOW! We've listed a selection of jobs below, but we've got many, many more. So if you don't see one to suit you, ring us anyway. TODAY!

IBM	DOS/VS	ESSEX	18 Mths	£3600
IBM	DOS/VS	W.1	18 Mths	£4100
IBM	OS	SURREY	18 Mths	£3400
IBM	DOS	BUCKS.	18 Mths	£3800
IBM	OS	MIDDX.	18 Mths	£4000
IBM	OS	CITY	18 Mths	£3800
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We have a very wide range of vacancies for Programmers and Analysts with at least two years' experience of RPG II.

Installations include IBM System 3, 370 and Model 32, ICL 2903, Honeywell, Burroughs and many, many more.

Clients are just as varied, including Banks, Insurance, Retail and Consultancies. Listed below are just some of our vacancies. If you find one that suits you – or even if you don't – we want to hear from you NOW!

RPG II	**Service Bureau**	**SYS3/10**	**W.1**	**c. £4000**
RPG II	**Insurance Co.**	**SYS3/15**	**City**	**£4300**
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RPG II	**Manufacturers**	**SYS3/15**	**Middx.**	**£3500-£3800**
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ANALYSTS/PROJECT LEADERS £5,000-£6,500

N. SURREY & MIDDX.
If you have had at least two years' systems experience we would like to hear from you. Several vacancies exist for Analysts with varying experience. The project leaders posts would suit those with about 4 years' systems experience and some project control.

TRAINEE ANALYST/PROGRAMMERS circa £4,000

H. WYCOMBE & UXBRIDGE & HAYES
Ideal opportunities for programmers wishing to move into systems. Any programming language considered

PROGRAMMERS/DESIGNERS To £5,500

CROYDON
As a result of management approved extensive development plans. Several positions exist for programmers at various levels

SYSTEMS ANALYSTS £4,500-£5,750

BRIGHTON
At least two years' Systems experience is required to work on project from feasibility study to implementation. Senior positions involve some project control. Graduates preferred

SYSTEMS PROGRAMMERS To £4,500

W. SURREY
R/P System Programmers ideally with assembler experience on mini computers are required. Preference will be given to graduates or equivalent in Computer Science, Maths or Engineering.

Please phone for application form

AMES PERSONNEL
TELEPHONE: 01-767 0611

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We need more good field and in-house engineers!

Our sales and support requirements are increasing rapidly and we are looking for people well qualified and versed in computer peripherals with special reference to core memory and memory systems, disc drives and tape drives.

There are both senior and junior positions available and we will be pleased to hear from you if you think you can make the grade.

Applicants should have a good background knowledge of electronics with ability to service down to component level, at least two years of practical experience and the ability to absorb continuing training in the latest techniques. These positions provide excellent career opportunities, salary and company car for the senior engineers.

Please apply to Personnel Manager, Ampex Great Britain Limited, Acre Road, Reading, Berks. Telephone Reading 85200.

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Systems Analysts
up to £4,300 p.a.

The Management Services Department of TI Tube Division Services provides an internal consulting service to the 20 operating companies of the Steel Tube Division which have a combined turnover exceeding £300m. and manufacture and market a wide range of products.

Due to promotions within the Department, we are now able to offer attractive posts to analysts. These appointments provide the ideal opportunity to gain wide experience of systems – using main frames and minis and employing the latest techniques in data base and data communications – for manufacturing, commercial and other functions.

Ideally candidates should be primarily interested in application rather than computer technology and be sufficiently self motivated and experienced to enable them to work on their own initiative in operating company situations.

Most projects are at companies in the West Midlands and those further afield may occasionally involve an overnight stay.

Applicants should have a working knowledge of industrial information and control systems using computer or O & M techniques gained from 2-3 years practical experience.

The positions are open to men and women and offer excellent career development prospects in Management Services or in Line Management. Terms of employment are good and include travel and mileage allowance.

Please apply in writing giving full personal details of experience to date to:

Mr. L.E. Fearenside, Personnel Manager, TI Tube Division Services Limited, TI House, Five Ways, Birmingham B16 8SQ

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Applications are invited from graduates with good honours degrees for the following posts

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Ref. CL/41/CW

The information services provided to computer users include a wide range of documentation, an advisory service, short courses and instructional software. The successful candidate will be expected to create new initiatives in this area in addition to undertaking several on-going commitments

COMPUTING OFFICER (SYSTEMS)
Ref. CL/42/CW

The successful candidate will work on a linked PRIME 300 system and should have some experience of mini computers and be interested in communication protocols and network development. Experience of assembly language programming is essential and knowledge of real time working and Fortran would be desirable

Salary on the scale £3333 - £5627 per annum. USS/FSSU

Application forms and further particulars may be obtained from the Registrar, University of Salford, Salford M5 4WT, to whom completed forms should be returned by 19th September, 1977, quoting the appropriate reference number

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A rapidly expanding U.K. company engaged in Maintenance and technical training projects worldwide require personnel with the following qualifications and experience on our permanent staff overseas:

A. IBM 370/158
   1. Programmer with minimum 2 years' experience in OS/VS1
   2. Operation Support Technician on above equipment. Minimum 2 years' experience.

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C. Systems Analyst with software/hardware and PM knowledge.

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Suitable applications to:

Mrs. A. Nairn
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Rose Industrial Estate
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Or Telephone Bourne End 22823

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The people we require will have some experience in assembly level programming and in one or more of the following areas:–
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The rewards with NCR, in addition to high job involvement and excellent social amenities, include a negotiable salary, 35 hour week, with the possibility of paid overtime, pension and life assurance schemes, subsidised catering facilities and generous relocation assistance.

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Ian Hume, Personnel & Employee Relations, NCR Manufacturing Division, Kingsway West, DUNDEE DD2 3XX.

NCR

Borough Treasurer's Department

Programme[rs]

AP.2/3 £2529 to £3282 + £312 salary supplement + phase 2 supplement

The Council operate an ICL 1901A with tapes and discs. Candidates must be experienced in COBOL.

Assistance will be provided for removal expenses, and provision of housing accommodation in approved cases.

Application forms and job descriptions available from Personnel Officer, Town Clerk's Department, Municipal Offices, St. James Street, Accrington, Lancs. BB5 1LY to whom they should be returned not later than 23rd September, 1977.

Canvassing of Senior Officers or Members of the Council will automatically disqualify.

Borough of HYNDBURN

THE UNIVERSITY OF MANCHESTER

LECTURER IN COMPUTER SCIENCE

Applications invited for the post from applicants with good general background in Computer Science, particularly in ... Compiling Techniques ... System ... Implementation Languages ... with an interest in ... Architecture and ... of Computer/Operating Systems ... be strongly preferred ... within ... Superannuation ... and application forms ... September ... The University, Manchester ... Quote ref. ...

Remember when big software companies were still small enough for you to matter?

It's not hard to see why the software industry is so attractive to staff. There is the wide range of applications and computers. The high professional standards. Stimulating colleagues whose experience covers many technical disciplines. Above all, the satisfaction of being in an environment where the individual counts. Where career opportunities and progression are carefully matched to personal ability and where each man and woman sees the direct results of their efforts.

Unfortunately, growth can bring problems to even the best software company. At 300 professionals (give or take a few) the second tier of management arrives. The people at the top are that much further removed from both employees and clients. And for the really ambitious reaching the top has become harder. Later, at a strength of 400 to 500, many staff begin to feel that they might as well be in a company of 10,000.

Data Logic has 180 professional staff. We are big enough and financially secure enough to be credible for projects as large as any that our competitors can take on. We are still small enough to know whether a man in the lift is an employee or a visitor. Per capita we are probably the most profitable software company in the country. That demonstrates the quality of our project teams and management. It also matters directly to our staff, all of whom share significantly in the profits which they create.

We are growing steadily. Not uncontrollably fast, yet at a rate giving all of us at Data Logic the opportunities we want. We plan to grow even more as the vacancies below show. But we are still some way from that 400 mark. And when we get there we happen to believe we'll handle it rather well.

Come and meet us to judge for yourself. We think you'll agree.

Project Managers

For mainframe, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly, Data Logic's turnkey projects involve multiple, separated minicomputers.

Applicants must have at least 5 years implementation experience. They must have managed a sizeable project or have taken substantial team responsibility.

Database Consultants

To advise clients on the creation or upgrade of databases and to assist Data Logic teams in the design of retrieval systems. Projects will involve both mainframe and standalone minicomputer configurations.

Applicants should have experience in the design of record structures and have used at least one of the leading database packages such as ADABAS, IMS, TOTAL and DMS/2. Knowledge of banking or insurance is of particular interest.

Senior 2900 System Designer

For consultancy and implementation projects, with a bias towards large ICL 2900 models. Applications will include database systems and communications networks. Extensive knowledge is required of hardware capability, operating systems and standard software. The scope for application of this knowledge and for career progression will be considerable.

COBOL and PL/1 Analysts

For mainframe projects involving a variety of interesting and demanding applications, including banking, insurance, manufacturing and distribution.

Applicants should have 3-5 years analysis and programming experience. A sound knowledge of CICS will be an added advantage.

Minicomputer System Designer

For work at the forefront of the commercial application of small computers. The majority of projects will involve data communications and several systems now in their early stages include many interconnected processors.

Applicants should have at least 3 years design experience, preferably including system sizing and performance assessment.

Scientific/Mathematical Programmers

Principally for real time minicomputer systems applied to analysis and/or control in scientific environments. There may also be some problem solving in high level language on mainframes.

Applicants should have a relevant degree in the mathematical sciences and one or more years practical experience in assembler or FORTRAN.

Digital Engineer/Programmers

For design and development of systems incorporating custom-built devices such as interfaces and terminals, with an emphasis on the use of microprocessors.

Applicants should have a degree in electronics or computer science and have programmed mini or micro computers at assembler or microcode level.

For mainframe assignments we are seeking knowledge of IBM 370, ICL 2900 and 1900 series, Burroughs B6700 and Honeywell H6000.
For minicomputer projects, knowledge of Data General or DEC machines is preferred, although a background with any other leading make of small computer is of interest.

Data Logic offers four weeks annual leave, free insurance and a contributory pension scheme. Salaries are excellent and in addition all staff share in company profits. We pay particular care to career development with the aim that responsibility and technical skills progress as fast as individual capability permits.

DATA LOGIC

Most vacancies exist in London, the Midlands and Manchester. Write or telephone to:

W. D. Barrow	A. W. Taylor	J. Anderson
Data Logic Limited	Data Logic Limited	Data Logic Limited
Westway House	Foley Estate	Warwickgate House
320 Ruislip Road East	Hereford	Warwick Road
Greenford Middlesex UB6 9BH	Tel: 0432-55211	Stretford Manchester
Tel: 01-578 9111		Tel: 061-872 3232

PROGRAMMERS

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If so, use the coupon to tell us.

REF DT/349

PERSONAL DETAILS

Name

Address

Home tel no Age

Office tel no (will be used discreetly)

EDUCATIONAL QUALIFICATIONS

DATA PROCESSING EXPERIENCE

Years programming Years systems analysis

Languages used

Machines worked on

Present salary Salary required

Jobs sought

Send to **David Torvell**, Ivor Norton Management Services Ltd., 85/87 Jermyn Street, London SW1Y 6JD

Ivor Norton

Management Services Ltd

P.O. Box 63, Copthall Tower House, Harrogate, HG1 1TS. Tel: Harrogate 66628.

85/87 Jermyn Street, London, SW1Y 6JD. Tel: 01-930 6851.

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Priestman is one of Britain's leading manufacturers of quality construction equipment.

The successful applicants for these demanding posts will have a dynamic personality, the ability to lead and a proven record in the industry. Experience of B1700 and/or DMSII is desirable.

Reply in strictest confidence to the Data Processing Manager,

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HEDON ROAD HULL NORTH HUMBERSIDE

Software Programme[r]

Sussex c £5[…]

A forward looking and profitable manufacturing company with a growing commitment […] processing now has need of a person to fulfil the Systems Programmer role.

The prime functions are to achieve optimum performance of the operating system and […] software, liaise with the applications area to assist, educate and produce standards and […] technical support internally.

The requirement provides the opportunity to work within a small, friendly department in a p[…] rural area but with a wide choice of housing, easily accessible to the South Coast. Generous […] assistance is available where necessary.

It is preferred that applicants have a sound background of ASSEMBLER programming in a s[…] environment, ideally IBM DOS and/or DOS/VS but programmers with a minimum of 2 yea[rs] wanting to enter the technical area will be considered for training.

Please telephone our CROYDON office for further information. Please quote ref: CW55-7H.

01-686 9693 (24 HOUR ANSAPHONE)
19 PARK STREET, CROYDON, CR9 1TN

061-236 2419 FAULKNER HOUSE
FAULKNER STREET, MANCHESTER, M1[…]

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CAPP ASSOCIATES
LONDON AND MANCHESTER

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Having recently advertised for an analyst and a programmer, we find that our increased development plans necessitate the addition of another programmer to our team.

We are embarking on a major development phase to supply computing facilities to newly acquired companies in our group. Areas covered will range from order/invoicing, stock control, etc., to rather more esoteric applications such as a structural stress analysis and heat loss modelling.

Our equipment comprises one of the larger I.B.M. System 3/15D installations in the country, with a strong commitment to developing our 3270 T.P. network. We require a programmer with at least 18 months' experience, who has the ability and the ambition to widen his/her knowledge of computing and business in many diverse areas.

If you think you can play an important and contributory role in our development plans and want to be involved in a major development at its inception, write giving full details to:—

Personnel Manager

KYLE STEWART

Ardshiel House, Empire Way
Wembley, Middx. HA9 0NA

or telephone: P. Campbell 01-902 5321 ext. 230

UNIVERSITY OF OXFORD

Appointment of a Computer Programmer

Applications are invited to fill a vacancy in the Data-processing and Management Services Section of the University Offices for an experienced programmer to join a systems/programming team designing and implementing an interesting range of financial and personnel record applications in the field of university administration.

The computer is an ICL 1901T. Applicants should have at least two years' experience of PLAN and/or COBOL, preferably on an ICL 1900 series machine. A knowledge of FTL6 would be an added advantage.

Salary will be on the scale at present £2904-£5.627 starting salary according to qualifications and experience.

Further particulars may be obtained from the Deputy Registrar (Administration), University Offices, Wellington Square, Oxford OX1 2JD, to whom applications should be sent by 19th September, 1977

SENIOR COMPUTER OPERATOR

is sought to work for one year within a small team at the College Computer Centre at Fulham Broadway. The person appointed will have at least two years' operating experience on main-frame computers, preferably CDC or ICL/Elliott, together with minimum qualifications of O-level Mathematics and English. The College computer is an ICL 4130 linked to a PDP11/40 'front-end' computer which handles telecommunications. Batch and time-shared interactive computing facilities for up to 18 terminals are handled concurrently. In addition, a separate batch terminal links to the University of London CDC machines. Salary will be within the range £3260-£3883 (inclusive of £450 London Allowance and Supplements). A shift allowance of £343 per annum is also paid for two-shift operation.

Applications, giving full details, to Mr. R. F. Shepherd, Computer Centre, Chelsea College, University of London, Pulton Place, S.W.6. Tel. 01-736 1244.

STRATHCLYDE

REGIONAL COUNCIL

COMPUTER SERVICES DEPARTMENT

SYSTEMS ANALYSTS

Salary Scale: A.P.III £3474-£3825 + supplem[ent] of £312 and 5% of salary.
A.P.IV £3957-£4395 + supplem[ent] of £312 and £208.

Placing according to qualifications and experience. Located at May House, Anderston Cross […] Glasgow.

Vacancies exist within Project Teams for analysts [to] contribute in the design of systems where volume[…] and where performance characteristics are import[ant]. The authority is developing major systems on a reg[ional] basis which will be operated on a teleprocessing [network] based on powerful H6000 series computer at […] and Hamilton.

The Computer Service Department provides ser[vices over an] extensive terminal network to the many varied dep[artments] within the authority and there is much scope for […] and developing applications employing […] computer techniques.

Applicants should have previous relevant experience.

FORTRAN PROGRAMMER

Salary Scale: A.P.III £3474-£3825 + supplem[ent] of £312 + 5% of annual salary.
A.P. IV £3957-£4395 plus supplem[ent] of £312 and £208.

Placing according to qualifications and experience. Located at May House, Anderston Cross […] Glasgow.

A vacancy exists within the project Team which […] computing service to a wide range of departments [of] the authority on an extensive terminal network.

A large variety of powerful packages are supported [for the] use of technical and other departments. The range [includes] Engineering Design, Traffic Analysis, Statistical […] Interactive Graphics, PERT, Highways Design, etc. [The] work includes implementation, customer supp[ort and] package development.

This is a small team operating in a very significant [area] providing stimulating and challenging work. Ap[plicants] should have previous relevant experience.

Application forms for all the above posts […] obtained from the Assistant Director of Man[power] Services, 21 Gordon Street, Glasgow G1 3[…] returned by 15th September, 1977.

R. M. O. McCULLOCH
Director of Manpower S[ervices]

ANALYST

A leading publisher of Scientific documents [in] London requires an ANALYST.

The work comprises instructing and […] Computer bureaux in U.K. and U.S.A. and […] customers on questions relating to our O.P. […] and our international on-Line retrieval service[s].

The successful applicant will have at least t[wo …] systems experience and some programming […] preferably on I.B.M. 360/370 systems, plu[s] some on-line experience. Preferred age 25-30 […]

The position carries a salary of up to £5,000 […] to experience. Holidays and benefits […] associated with a progressive, expanding Com[pany].

Please write with abridged curriculum vitae […]

Personnel Manager,
Derwent Publications Ltd.,
Rochdale House, 128 Theobalds R[oad],
London WC1X 8RP

SENIOR ANALYST/PROGRAMMERS

**SOUTHERN ENGLAND
CLOSE TO SOUTH COAST**

**SALARY up to £6500 pa
PLUS BONUSES**

Do you have a thorough knowledge of RPG 11 and an interest in working on multi-location systems, involving occasional overseas travel?

If so, our client would like to meet you.

As an international organisation, with worldwide marketing interests, they have established computer systems in numerous locations, including Japan, Canada, Australia and most European countries.

All systems development, based on either IBM System 3 or IBM System 32 hardware, is developed/controlled by a central team at their UK Data Centre.

Their prime requirement is for two Senior Analyst/Programmers for the manufacturing systems group.

If you have sound manufacturing/commercial systems and programming experience, have seen at least one major system through to implementation and really enjoy complete involvement in all aspects of systems development, then you would find these positions particularly attractive.

If you can show our client that you have these qualities, then you could be earning a total package **worth up to £7000 pa** in the very near future. In addition to salary there are discounts on company products and generous relocation expenses.

Please apply to John Goldsmith, quoting Ref. No. 691.

Computing Services Association

**John Goldsmith (Computer Services) Limited
15 Buckingham Palace Road, London SW1
Tel: 01-828 5356, 24-hour answering service**

JOHN GOLDSMITH (Computer Services) Ltd.

2 AREA SALES SUPPORT EXECUTIVES

NATIONAL BUREAU

**SALARY RANGE £4,000-£5,000
+ CAR + BONUS**

Due to continuing expansion, our Clients, a well established and specialised Computer Bureau, seek two Professionals to augment their existing marketing team. Responsibilities will include: detailed pre-sales work combined with on-going post-sales responsibilities, including: training, implementation and customer liaison. These posts are seen as developing opportunities for senior sales and marketing positions.

Successful candidates should have experience of data processing in a user environment combined with an understanding of modern business needs. Candidates should be confident and well presented, and capable of communicating at both boardroom and shop floor levels. One of the successful candidates will be based in the Manchester area, the other in Southern England; however, travel to user sites within each area is involved.

An excellent salary will be paid, based upon previous experience, and the job also carries a Company car plus an excellent incentive scheme and fringe benefits.

CONTACT: DAVID WADE on:
061-833 0676
or the London Office on:
01-935 0671

REF: 77/09/1

LONDON EUROPEAN TRAINING MANAGER

INCOME TO £9.500 +CAR+BENEFITS

Our Client is one of the most successful Computer Services Operations in the World, which sells and supports sophisticated solutions to business and management problems. The Company's network spans Europe and the USA, with products and systems which are amongst the industry's finest. The Company is noted for it's sound attitudes to training, and it's recognition of the importance of the internal training function. This key appointment arises out of the promotion to a Senior Sales Management level of the present incumbent. It calls for the active participation in the sales and management training of the Company, and the supervision of technical training.

Interested candidates should have:

- ★ probably a sound sales and sales management background within the computer services or business machine industry — this period should have been spent with an organisation which has recognised professional sales training: for example: NCR, Burroughs, Olivetti, Philips, etc.
- ★ the ability, not only to deliver our Client's packaged sales and management training, but also to develop future material.
- ★ a desire to develop a career within a fast-moving International Company
- ★ aged 30/40

CONTACT:
PETER RIGBY on:
021-236 3781

REF: 77/09/2

MANCHESTER

DATA PROCESSING MANAGER

SALARY NEGOTIABLE

We are retained to recruit a data processing professional for our clients, a public Company specialising in high technology products to the transport industry. The successful candiate will take complete control of a small data processing department utilising Burroughs B700 hardware. Duties will include systems development, programming, tuning and control of operations/data preparation.

Our clients require:—

- ★ a proven track record in systems/programming
- ★ Burroughs experience (preferred)
- ★ an understanding of small machine operations
- ★ good man management skills
- ★ the ability to communicate fluently and liaise at all levels.

Our clients offer excellent benefits including: an above average pension scheme and relocation expenses by negotiation.

CONTACT: David Wade: 061-833 0676. REF. 77/09/3

SCR

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 3BD

LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

Computing Services Association

QRH COMPUTER RECRUITMENT

We are currently seeking the following staff for QRH Software Ltd., a member of the QRH Computer Group. The growth rate over the last 6 months has been approx. 100% and to continue on those lines we urgently require in.—

WEST YORKSHIRE

Project leader to £5700. Pref. with manufacturing systems and commercial expertise. Must be able to successfully develop and control own team.
Programmers (2) to £4500 COBOL or RPG II knowledge, general commercial applications.
Planned progression to systems work.
For our other clients we urgently need in —

YORK

Programmer to £5000. COBOL or Assembler with general systems knowledge. Well known company. Good opportunity for hard worker.
Graduate or HND to join team to train as programmer. Planned career path in Computer World.

LEEDS

Programmer to £3800 IBM and COBOL experience preferred. Large progressive group with additional equipment being installed this year.
Analyst/Programmers to £4500 COBOL, PLAN or PL1 experience. General commercial experience. Interesting work with opportunity to learn.

BRADFORD

Programmer to £3800. COBOL or PLAN experience. Small team set-up in well-known company.
We also have many other vacancies in the North.

QUEENS ROAD MILLS, HALIFAX
WEST YORKS HX1 4LR
HALIFAX (0422) 58231 (10 lines)

BORDERS REGIONAL COUNCIL

COMPUTER MANAGER

PO II £5895 to £6405 + £520 supplements

Applications are invited for the above post from computer professionals with a minimum of five years' experience.

The Council will shortly upgrade its existing IBM 370/115 installation to a 128K capacity. There will be three disk drives and one tape drive, the system running under DOS/VS.

Applicants must be able to demonstrate a proven record of successful records systems implementation and have the ability to control a multi-discipline team of analysts, programmers and operations staff.

Application forms and further particulars may be obtained from the Head of Personnel and Management Services, Regional Headquarters, Newton St., Boswells TD6 0SA, with whom applications should be lodged not later than 9 September, 1977.

TELEPROCESSING IN NORWICH

Our client is making major upgrades to their IBM 370 (working under DOS/VS) to undertake additional teleprocessing developments which give **exceptional opportunities** for project team staff at all levels to combine interesting career prospects and attractive working conditions with the "good life" of Norwich — (excellent educational, shopping and cultural amenities, easy access to the unique recreational facilities of the Norfolk Broads, countryside and coast line, plus a wide choice of relatively inexpensive housing).

SYSTEMS ANALYSTS

Must possess the ability to communicate effectively with all levels of management; and have previously implemented at least one major system in a financial environment. Experience of TP systems an added advantage.

PROGRAMMERS

Should have at least two years Assembler background and whilst experience in CICs/VS and DL/1 would be advantageous, training will be available.

In addition to **competitive salaries,** the excellent company benefits include free lunches, flexible working hours, and assistance with relocation expenses where appropriate.

For immediate action, in complete confidence, ring Bryan Richmond on Norwich (0603) 867233 any day up to 9.00 p.m., or write with brief details of experience and salary to:

EAST ANGLIAN SYSTEMS LIMITED
PO Box 70, Norwich NR1 4EF

Systems Test Engineers

AMDAHL is a leading manufacturer of large scale, high-speed computers. We are establishing our first manufacturing base outside the U.S. in the Dublin area to further our expansion. In our first full year of operation, 1976, our sales revenue was U.S. $93,000,000.

Amdahl needs an Exceptional Team

As Amdahl's rapid growth continues, we need professional people with experience to fill the following positions.

Systems Test Engineers

Candidates for this position should have 3-5 years experience in hardware final test, logic design, or field support of medium or large scale digital computer systems. IBM 360/370 or compatible systems is preferred. HNC/HND, Degree or equivalent technical training is required.

Lead Systems Test Engineers

Candidates for this position should have 7-10 years experience in hardware final test, logic design, or field support of medium or large scale digital computer systems. IBM 360/370 or compatible systems is preferred. HNC/HND, Degree or equivalent technical training is required.

Systems Test Supervisor

Candidates for this position should have 8 or more years in the computer industry with at least 3 years of technical management experience. Their field of expertise should be hardware final test, logic design, or field support of medium or large scale digital computers, preferably IBM 360/370 or compatible systems. A degree is highly desirable.

Although the past year has seen us grow, there's still room on the ground floor for individuals who seek a challenging, friendly, start-up environment. Our benefits package is excellent and you'll be well compensated for your efforts. Suitably qualified men and women should forward completed curriculum vitae to:

George Zukerman, Amdahl (UK) Limited,
Viking House, Lampton Road, Hounslow,
Middlesex TW3 1JD. Tel: 01-572 4312

amdahl

MYRIAD OPERATIONS LIMITED

Computer Personnel Consultants

IBM OPERATORS

LONDON — **6 months—3 years OPERATING** — **To £4100+**

There is no better way to gain very valuable operating experience than running a variety of commercial and scientific applications whilst employed by a computer service bureau. The pressure of such an active environment demands the utmost from a dynamic highly-competent operator, capable of making decisions, recognising problem areas, and working with a minimum of supervision. Someone who will react further than just loading tapes or changing paper.

You should have a minimum of six months' operating experience, preferably in an IBM OS environment. A progressive career to date is important, but enthusiasm and determination to succeed will add weight to your application. You should also feel ready to accept responsibility.

If you feel confident enough to enter the elite, in a powerful 370 installation, then the rewards are high, and future prospects excellent. This is a rare and important opportunity to join a close-knit team, within a sophisticated computer organisation.

Please telephone for a confidential discussion or write:
30 Fleet Street London EC4Y 1AA
01-353 5868

PROGRAMMERS

MAINFRAME AND MINIS

CMES is a successful (Software) house established in 1970. WE are looking for good programmers who will be based at our St Paul's office or at our clients in London, Home Counties, MIDLANDS & SOUTH COAST so that we can continue our expansion. We would prefer you to have a minimum of 2 years' experience on more than one machine with at least two languages.

Remuneration will be attractive and negotiated in accordance with your experience and ability. Our urgent requirements are:—

370	**DOS or OS**	**PL1 or BAL**
370	**DOS**	**COBOL**
1900	**G111**	**COBOL**
PDP11	**RSX or RSTS**	**BASIC + or MACRO 11**

Telephone or write to:
Bob Osborn
21/25 Gold Road, W12 8QQ. 01-743 1114

Use our FREEPOST service if you wish or leave a message during the evening on our Ansaphone.

CMES

PARIS—View of the Champs Elysées at night

Dear Alan,
Met a girl from ITT Harlow last night—sitting at same table in a café along the Champs Elysees. Couldn't believe it when she said she was a programmer too! Told me you need more COMPUTER PROGRAMMERS for UK Head Office to work on new systems for Honeywell 66/20—on real-time basis. Is it true that the salary would be around £5,000?
I have nearly 2 years COBOL experience and am looking for new job in large expanding company such as ITT Components Group Europe—very impressed with company's track-record throughout UK and Europe... would like to see you when I return to discuss opportunities. Will phone you on Harlow (0279) 26811 or write again. Chris
P.S. The lady sends her regards!

FONTAINEBLEAU SEINE ET MARNE

ALAN LOCKERBY
ITT COMPONENTS GROUP, EUROPE
EDINBURGH WAY,
HARLOW,
ESSEX
ANGLETERRE

Components **ITT**

MYRIAD APPOINTMENTS LIMITED

Computer Personnel Consultants

SENIOR PROGRAMMING STAFF

MIDDLESEX — **Large IBM Installation**

A major manufacturing and distribution Company to the west of London is seeking senior programming staff to supplement an existing programming team. The Company has recently upgraded their hardware and is currently developing several new systems using the latest IBM software.

A Chief Programmer is required to manage the programming team. A proven track record; capable of scheduling work, meeting deadlines and ability to communicate with senior management is essential.

A Systems Programmer or experienced Assembler Programmer is required to eventually take full responsibility for systems software.

Salary for these positions will present no problems for the successful applicants and the benefits package is commensurate with that expected from a large international Company.

COBOL PROGRAMMERS

New Department

C LONDON — **£3800-£5500**

Excellent opportunities have arisen for Programmers seeking a position within a new team in a professional environment.

The company, part of an international group, is a leader in its field. Successful applicants will be engaged on extensive development work on an on-line commercial project. Training will be given and those appointed will be encouraged to accept increasing responsibility and gain progression towards design and analysis in the future.

Candidates should be able to offer 1-4 years COBOL experience, as appointments will be made on a level appropriate to individual experience.

The company has a range of fringe benefits including four weeks annual holiday and flextime.

SENIOR ANALYST/PROGRAMMER

3 years' experience

LONDON — **c £5500**

This position offers positive career prospects to a programmer or analyst/programmer seeking a greater challenge, more advanced technical experience and additional responsibility.

Having successfully computerised a number of accounting and management information systems, the Company is now developing a large on-line system to assist with the production and distribution of a wide range of its products. Working within a small specialist team the successful candidate will have the opportunity to broaden his/her experience on this unusual application using the latest techniques and equipment.

Applicants should have around three years' programming experience and be keen to participate in analysis activities involving considerably user contact.

This is a senior position within an expanding organisation where conditions of employment are excellent and accompanied by a range of fringe benefits.

PROGRAMMER

S. E. LONDON — **to £5,600**

This is an interesting and challenging opportunity for an experienced programmer to join an active department with an enthusiastic approach to computing.

There will be an initial period, during which the person appointed will acquaint themselves with the installation and the company business. After this period they will be encouraged to work on their own initiative often unsupervised. They will become involved in all aspects of systems development and will be largely responsible for the smooth running of current live systems.

Candidates will be able to offer programming experience, preferably using COBOL, coupled with some exposure to basic systems analysis.

Please telephone for a confidential discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

ADP PRODUCTION DIVISION

Our Production Division has the largest commercial DEC 10 time sharing installation in Europe. We operate 6 DEC System 10's in the U.K. each with 256K memory, 200 Mbyte disks, magtapes, card readers, line printers and paper tape equipment. We support a comprehensive network throughout the U.K. and Europe and have a Transatlantic link to 12 DEC System 10's in the U.S.A.

We are looking for the following technical staff and can offer you the opportunity to expand your knowledge and work in a sophisticated and rapidly developing environment.

COMPUTER AND PERIPHERAL ENGINEERS up to £5.5K + car allowance

To be trained on and assist in the daily development of the systems backed up by junior and senior engineering staff. We are looking for experience on a wide range of peripherals plus a good background in chip level repair of memories and processors.
Contact by phone or letter CHRIS TURNER. Ext. 274 or 249.

SERVICE ENGINEERS ELECTRO/MECHANICAL up to £3.8K

Required to work in Greater and Central London areas. A sound knowledge of electro-mechanical devices is essential and a good electronic background would be an advantage. If you have worked on Teletype 33/35's, needle matrix printers, telex equipment or thermal printers we will be eager to see you. **Contact by phone or letter PAUL BARFIELD. Ext. 252.**

OPERATIONS STAFF up to £4.5K

We require all grades of Operators to work on our sophisticated systems. The total configuration is available 24-hours/day, 7 days/week and operates on a 2 shift system. If you have experience of supervising staff and are dynamic and intelligent then give us a ring for an informal discussion.
Contact by phone or letter BOB CHRISTIANSEN. Ext. 250.

CUSTOMER SERVICE OFFICERS up to £3.5K

We are looking for intelligent young people with a confident telephone manner who will respond to this important function in the Company. The job entails responsibility for the I/O control of all Media. We work a 2 shift system 0800-1600 and 1200-2000. We would expect you to have a good knowledge of operations/data control and a desire to operate peripheral equipment—printers/tape equipment/graph plotters, etc.
Contact by phone or letter KEITH ANDREWS. Ext. 201.

Or ring MAGGIE LEWIS. Ext. 249 who will take your name and telephone number and pass it on to the appropriate Manager.

ADP SYSTEMS AND PROGRAMMING DEPT.

Our Systems and Programming Department provides a professional implementation service to our Clients in the U.K. and EUROPE. We provide tailor made systems using a combination of programming packages and standard languages applied to business oriented applications.

We are looking for staff in LONDON, BIRMINGHAM and MANCHESTER and if you have a good Systems and Programming record with a COBOL and/or FORTRAN background then we will provide you with a wide variety of projects + on-line program development + close liaison with end users and the opportunity to work in a Company which is part of the largest bureau operation in the World. We are currently planning to double the size of the department and are seeking suitable candidates for the following positions:

SYSTEM CONSULTANTS up to £6.5K

Must have significant systems design experience coupled with an active involvement with a sales force in a pre-sales role. They will conduct feasibility studies, prepare proposals and quotations for both fixed price and time and materials contracts and assist sales personnel in the presentation of these proposals. Similar experience will probably have been gained with a bureau, software house or manufacturer.

PROJECT LEADERS up to £6K

Must be capable of controlling projects through all implementation stages against time and financial budgets, conducting progress meetings with clients, supervising training of users, and ensuring a smooth handover of projects.

ANALYST/PROGRAMMERS up to £5K

Must be able to take responsibility for the detailed design of systems, and assist with their implementation. Previous experience with on-line applications would be useful.

PROGRAMMERS up to £4K

Must have a minimum of 18 months practical experience gained in a formal programming environment and the ability to fit into an expanding team.

Contact BERNARD EDWARDS. Ext. 270.

The Company provides BUPA, Pension Scheme and professional residential training and career development programme.

ON ANY OF THE ABOVE POSITIONS YOU CAN CONTACT PETER PEARCE (Recruitment Manager) OR HIS SECRETARY ANITA CAVALIER WHO CAN GIVE YOU MORE INFORMATION.

Ring: 01-637 1355 or write to ADP Network Services Limited, 179-193 Great Portland Street, London W1N 5TB.

CHALLENGING MINI-COMPUTER DEVELOPMENT

(Overseas Relocation Opportunities)

SURREY — Circa £6,500

Our client's International Division is commencing a major prestigious project developing specialised commercial applications using COMMUNICATIONS and DATAMANAGEMENT techniques, utilising their latest range of mini equipment.

The new team being formed is to include:—

SENIOR PROGRAMMER/ANALYST

Your challenge will be to
- ★ Motivate and lead a small team of programmers.
- ★ Monitor team performance and schedule resources.
- ★ Liaise closely with the Systems Consultant in developing functional specs.

2 PROGRAMMERS

You will need to
- ★ Rise to the challenge of new techniques.
- ★ Develop and test real-time programs with a minimum of supervision.
- ★ Possess Assembler level experience.

Both levels require experience of Real-time Mini applications. Equally, both represent exciting career opportunities as part of a Division with an envious reputation for developing impressive and advanced systems.

REF. 77/9/9

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR
MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 3BD
LONDON 01-935 0671 FREEPOST 6
Freepost 6, 102, Blandford Street, London W1E 1JZ

SCR

Computing Services Association

Edmund Howard's Client Album

TEST PROGRAMMERS — HERTFORDSHIRE — SALARY C. £5,000

Experienced programmers are required to work in the Product Test department of our Client's Software Development Headquarters. Main responsibilities will include developing tests and conducting trials of newly developed software prior to general release. The ability to write comprehensive reports and negotiate test objectives is essential.

Candidates should possess a practical approach to problem solving and an appreciation of the eventual users requirements which should reflect in the completed product. Rapid career advancement is envisaged for those with relevant experience wishing to capitalise on their present expertise For further details please quote CW148

DEVELOPMENT PROGRAMMERS — HERTFORDSHIRE — SALARY UP TO £6,000

One of the world's leading computer equipment manufacturers is currently recruiting experienced programmers to work on the development of new products within their European Software Development Group. Candidates' experience should stem from a computer manufacturing background with a strong bias towards assembly level programming. A working knowledge of Disc based systems plus some communications experience would be a decided advantage.
This is a unique opportunity to join a rapidly expanding department where you can develop your talents to the limit. Career prospects are excellent within the department. For further details please quote CW149.

SOFTWARE CONSULTANTS (1903 going to 2960) — ESSEX — C. £6,000

A leading manufacturer of precision engineering products is currently seeking a software specialist with at least five years' experience in systems programming.
The person appointed will report to the C.S.M. and be responsible for software evaluation, software planning and maintenance and also the training of systems and programming staff in current software developments.
The company has plans to develop extensive real-time systems for its commercial and manufacturing activities. An ICL 2960 will be installed in a new computer suite towards the end of 1978 to support these developments and will utilise VME/B TPS 1900 and DME.
Current systems are based on an ICL 1903A running under GII+.
This is an ideal opportunity for someone who wants direct involvement in the software activities associated with a large scale real-time system.
For further details please quote CW150.

TECHNICAL WRITERS — HERTFORDSHIRE — SALARY UP TO £5,500

Does your forte lie within the production of technical specifications and software manuals? If so, or even if you have two years' solid experience in a technical area, our client would like to meet you and perhaps offer you a more promising career.

Firstly, there are one or two qualifying factors The Organisation concerned is a manufacturer of intelligent terminals and computer peripherals who strongly believes that its biggest asset is the employee This healthy working environment enables them to produce one of the finest products around, which gives you a rare opportunity for career progression with exceptional security

Our client asks for people with the right personality to tackle and solve all manner of problems in close association with the software design and product test teams, and with the enthusiasm to maintain a high standard of documentation at every stage of their development projects For further details please quote CW151.

Edmund Howard & Partners
Computer Personnel Consultants
5 Brighton Road, Surbiton, Surrey. Telephone 01-399 9183.
38 Grafton Street, Dublin. Telephone 775 756.

Hintons

We are a public company involved in retailing in the North East of England operating over 50 outlets in the area.

We have recently upgraded our computer to a B3700 300KD with 128m characters of LAK disc and the usual other peripherals.

Now we are embarking on extensive redesign of many of our systems and have vacancies for the *following professional staff:*

Systems Analyst

With a sound commercial and programming background, *must be able to communicate with all* levels of management.

Programmers

With a good grasp of programming techniques and at least one year's COBOL experience.

Multi-programming experience would be helpful but not essential.

Attractive salaries will be offered to the right applicants and bonus schemes are in operation.

Applications, giving details of career to date and when available for personal interview, to:

**Mrs. S. K. List
Personnel Manager
AMOS HINTON & SONS LIMITED
P.O. Box 24, Master Road
THORNABY, Cleveland**

UNIVERSITY OF OXFORD
Department of Engineering Science.

COMPUTER PROGRAMMER

required to assist with the research programme of the stellarator group at the Culham Laboratory. The principal activity will be to develop new programmes or modify those written for other physical situations to model plasma behaviour in stellarator geometry, and to assist with software for data acquisition and processing. Supervision will be provided by Dr. R. N. Franklin but the person appointed would work mainly at Culham.

Applications are invited from graduates (mathematics, physics or engineering), with experience in programming and numerical analysis. Salary according to age and experience on the Research Support Scale 1A (£3333-£5627 per annum). The appointment would be for three years' fixed term.

Applications to the Administrator, Department of Engineering Science, Parks Road, Oxford, by 20th September, 1977.

AMERICA — EAST COAST

SALES EXECUTIVES
ANALYST PROGRAMMING
SUPPORT STAFF

The Company is *a well known international supplier of computers, terminals and* general business systems.

They will make new appointments for sales and support staff to complement a vigorous and exciting plan. Vacancies are at a number of the company's East Coast offices.

The positions offer above average incomes and moving expenses will be considered. *A minimum of a two year contract of employment is envisaged and a positive career* progression based on success can be expected.

Applicants should have experience of sales or support in terminals and systems, which might include DATAPOINT, SINGER 1500, SAUNDERS or Mini Computers such as BURROUGHS, NCR and ICL.

For further information, please contact immediately the advising consultant, quoting Reference CW148.

**Insight Marketing & Personnel Consultants Ltd.
72-75 Marylebone High Street
London W1M 4AJ
Telephone: 01-486 5644**

METROPOLITAN
BOROUGH OF KNOWSLEY
Computer Section,
Depot Road, Kirby

COMPUTER PROGRAMMER

AP 3/4 £2922-£3702 + £312
& Phase 2 Supplement

He or she will be involved in the maintenance of existing financial applications and with a development of further financial systems. The installation comprises an I.C.L. 1901T Computer with communications devices. Both Plan and Cobol Languages are used.

Preference will be given to qualified applicants with at least two years' experience.

Ring 051-548 6555 or write to the Personnel Officer, Municipal Buildings, Civic Centre, Kirby, Liverpool L32 1TX for an *application form. Closing date* 16th September, 1977.

DUNDEE COLLEGE OF EDUCATION

ANALYST/PROGRAMMERS

Applications are invited from suitably experienced persons for *two new posts* in the Computer Centre, which is responsible for all computer services in the college. There are interesting opportunities in systems programming, and scientific and commercial applications, including library automation, on a recently installed DECsystem-20. Duties will include an advisory service to users.

Salary on the scale up to £4,344 with *possible future* advancement to a higher scale. Financial assistance towards the cost of removal expenses may be payable.

Further particulars and application forms may be obtained from the Administrative Assistant (Establishment), Dundee College of Technology, Bell Street, Dundee DD1 1HG to whom completed applications should be *returned* by 16 September, 1977.

We have been retained by one of our clients to recruit the following personnel

SENIOR ANALYSTS
ANALYSTS
SENIOR DESIGNERS
DESIGNERS
SPECIALIST/SENIOR PROGRAMMERS
PROGRAMMERS

All to be based at Croydon Surrey

Ring Sue 01-677 3021 for an immediate appointment PS Appointments, 181 Mitcham Lane, London, SW16.

ROYAL NATIONAL INSTITUTE FOR THE BLIND

TWO PROGRAMMERS

for Publications Department

(Moving to new premises ... Angel Underground Station)

We are soon to replace ... system with a dual ... system for on line production ... literature. As a result ... posts for people with ... who ideally will have ... some of the following ... Assembler, minicomputer ... provided. Opportunity to get ... ground floor of exciting ... Salary either scale ... £3438-£4230 dependent ... cations and experience ... staff restaurant

Applications giving age, ... salary, qualifications and experience, together with ... to: Mr. R. Hagger, Works ... 224 Great Portland Street, London W1N 6AA.

CAPITAL APPTS.

COMPUTER SERVICE ENGINEERS

Phone for free jobs list all areas

SALARIES TO £6000

34, Percy St. London, W.1.

637 5551 day, 445 0468 eve.

PROGRAMMER

IBM 360/370 — COBOL

International organisation buying merchandise for a major US retail group requires Programmer with minimum of 1 year experience, preferably on *IBM 360/370* under OS, for its London headquarters.

We currently operate in both batch and terminal modes in an OS environment on a bureau-based 370/158 system.

This is an opportunity to join a small team in very pleasant Oxford Circus offices.

Salary in range £3,500-£4,000 p.a. with excellent non-contributory benefits including BUPA, pension, life assurance and daily LVs.

MAY

Contact Peter ... May ... International ... 37 ... London, W1 ... 01-637 ...

Holland — Nijmegen

Initial Contract which could lead to permanent

- ★ But without the living costs of the larger better known cities
- ★ A progressive alert company with a DP unit committed to expansion
- ★ There is free tuition at the university language laboratory
- ★ A lively university town near the German border
- ★ Are looking for good staff who wish to live and work in Holland
- ★ Where applicable, for both married and single staff a relocation allowance would be made

Our clients believe that they have a lot to offer to the right people who are prepared not only to work for but to contribute to future developments of an unquestioned market leader. They require the following staff for both the DP unit and also a user department.

Programmers to FLS 35000
Programmer/Analyst to FLS 40000

If you have the following experience and are interested in these positions we would like to hear from you as soon as possible.

**Strong COBOL background (some RPGII would be useful).
Good DOS/VS experience
Multi application background (preferably in manufacturing areas).**

Our clients will be conducting interviews in the UK within the next 14 days

Please apply without delay to Gordon Cairns quoting reference no. C/690.

Computing Services Association

**John Goldsmith (Computer Services) Limited
16 Buckingham Palace Road, London SW1
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Norma Smith, Personnel Officer, Rolls Royce Limited, (Aero Division), P.O. Box 17, Parkside, Coventry CV1 2LZ. Tel: Coventry 27666 Ext. 336.

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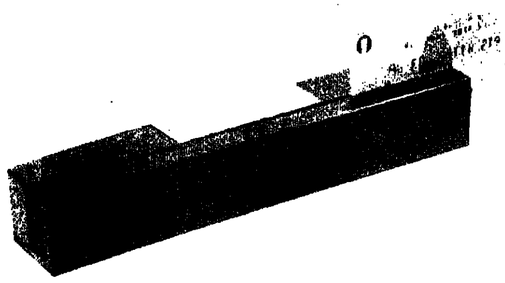
PRODUCT NOTES



From Tekdata is a US-made manually operated magnetic strip card reader that it has introduced into the UK. Named Model 40, it is intended for low-cost capture of data from stand-alone peripherals and is pictured above.

The unit will read ABA, IATA or THRIFT strip on magnetically encoded cards with a pass-through action. A special magnetic head and a self-contained electronic package will provide standard CMOS or TTL outputs in the form of a data stream and a strobe.

The Model 40 utilises a head that is gimble-mounted and individually suspended in a yoke by parallelogram springs, said Tekdata. This assembly will provide precise head gap to card contact and thus minimising spacing losses and bit drop-out when cards are warped, dirty or old.

Tekdata Ltd (CW), Westport Lake, Canal Lane, Tunstall, Stoke on Trent, ST6 4PA. Tel: 0782 811711.

Integral punch/read on 30 chps terminal

FROM Data Dynamics is a 30 chps microcomputer controlled keybonrd/printer terminal claimed to be the first with integral paper-tape punching and reading facilities.

Called the ZIP 30, the ASR terminal is built by the Data Dynamics subsidiary in France, Periferic SARL.

Data Dynamics quotes a one off price for the ZIP 30 of about £1,400 which the firm claims to be considerably less than the price of any other comparable equipment combination on the market.

The ZIP 30, which is also available in KSR and RO versions, uses a seven needle matrix head to print upper case ASCII characters in the form of a 5 x 7 dot matrix. Lower case is optional. An original and up to three copies can be printed.

Data Dynamics points out that the ZIP 30 is a direct plug in replacement for the Teletype 33 and uses standard Teletype roll paper.

ZIP 30 units are supplied on the Continent with an "AZERTY" keyboard while UK models come with a "QWERTY" keyboard.

Data Dynamics Group Ltd (CW), Data House, Springfield Road, Hayes, Middlesex. Tel: 01-848 8781.

Low frequency data digitiser

A COMPACT unit that can collect, digitise, and store low frequency data on a 3M cartridge tape is now available from Gould Advance.

Called the Gould 6100 data acquisition system, it can scan multiple analogue inputs at rates from 200 channels per second to one scan every 10 minutes.

The 6100 weighs 18 Kg and can come with a 12v or 28v dc power supply module for operation in vehicles, boats or aircrafts. Gould points out that output data can be monitored in real time using a Gould local display unit, a video terminal or a hard-copy printer.

The 6100 can be controlled from telephone or telemetry links using the Gould Communications interface option and is completely equipped for remote control via logic levels and switch closures, according to the manufacturer. The 12-bit successive-approximation analogue-digital converter offers a resolution of 0.05%.

Gould Advance Ltd, (CW), Raynham Road, Bishop's Stortford, Hertfordshire CM23 5PF. Tel Bishop's Stortford (0279) 55155.

Controller

TWO single board disc controllers for Data General and Digital Computer Controls minicomputers are now available from the Bytronix Corp of California.

The model B234 controller is software and media compatible with the DG4234 disc system and can control up to four Diablo Series 40 drives, or equivalent. It requires one slot of the computer chassis. The Model 446 is software, media and pin compatible with the DCC 116446 disc system and will control one or two drives.

Bytronix Corp (CW), 3751 East Chapman Ave., Fullerton, California 92631, USA. Tel: (714) 871/8783.

Tag reader

A HAND-HELD department store tag reader, the NCR 7876, has been introduced by NCR.

It is a pistol-shaped device and is presently compatible with the NCR 280 and 250 retail terminals, although it is available for use on both the NCR 255 and 2151 in the future.

It "reads" OCR-type (Optical Character Recognition) characters and so eliminates many of the errors made by manual key operators.

Prices for the 7887 start at £995.

NCR Ltd (CW), 206 Marylebone Road, London, NW1 6LY. Tel. 01-723 7070.

Dust control

FROM 3M is a vinyl-based dust and dirt-capturing mat known as Nomad Cushion Plus.

The London, W1 firm said that the mat is manufactured from a lightweight, non-woven vinyl which has low static properties and is flame-resistant.

It has a porous construction of coiled loops that are permanently fused together on a foam backing.

This traps the dirt and dust which can be removed via a suction cleaner, shaking or washing the mat.

3M added that the Nomad Cushion Plus will often be used in conjunction with dust control mats and is designed to make the normal tacky mat work more efficiently.

It is available in 3 x 20 foot rolls, costing £117.30 per roll, VAT extra; or as 3 x 5 feet mats costing £36.81 each, VAT extra. The mats are also available in either gold, red or green. Optional seaming kits and edging kits are also available.

3M United Kingdom Ltd (CW), Wigmore Street, London, W1A 1ET. Tel. 01-486 0322.

Ribbon

DATARIBBON, the printer ribbon division of Dataproducts International, is to introduce into the UK a narrow ribbon and a cassette ribbon.

The ribbons will fit DEC writers, Centronic printers and CDC narrow ribbon printers.

The cassette is designed as an alternative for the type IBM supply for its own machines and is thought to be the only one on the UK market at present.

Dataribbon has also produced a ribbon designed to operate on the ICL 1933 printer family.

Dataribbon International (CW), Sterling House, 31-39 South Street, Reading, RG1 4QT. Tel: 0734 585723.

Consultancy

THE Watford, Herts firm of Langley Metal Products is now offering a consultancy service for customers requiring tailor-made cabinets and racks.

Langley Metal Products Ltd (CW), Unit 4A, Lyon Industrial Estate, Hartspring Lane, Watford, WD2 8JU. Tel: Watford (92) 48327.

Ink rollers

THE Wilson Jones DataSystems division of Sandhurst (Stationers) Ltd announce a new range of ink rollers which, it claims, gives more than 100 million impressions and requires no ribbon or ink fountains.

The solid inking system is suitable for business machine in an ink-impregnated, plastic material with a locked-in ink supply.

This produces rapid, uniform application of ink wherever the type strike the roller. They are suitable for use from hand stamps to high-speed line printers, added Wilson Jones.

Wilson Jones DataSystems division, Sandhurst (Stationers) Ltd (CW), Spindleway, Crawley, Sussex. Tel: 0293 22218.

Portable data logger

A PORTABLE cassette data logger designed to record data from Texas Instruments Silent 700 terminals is now available from Christie Electronics of Stroud, Gloucestershire. Called the CDL100/S700 it is a development of the existing Christie CDL100 logger.

The CDL100/S700 can record data to Silent 700 standard from up to 100 channels and comes with interfacing and signal conditioning facilities for a wide range of input types, according to Christie. These include analogue, pulse, counter, parallel digital and changeover contacts.

The CDL100/S700 comes with Nickel-Cadmium battery/mains power pack and an environmentally proofed enclosure and weighs 11 Kg (24 lbs). Suitable operating environments listed by Christie include laboratories, power stations, production lines, traffic and environmental study areas, oil rigs and ships.

Christie Electronics Ltd (CW), PO Box 18, Stroud, Gloucestershire, GL5 1NE. Tel: Stroud (045 36) 77505.

Magnetic cassettes

A RANGE of magnetic tape cassette units, the CS Series, has been introduced by Digital Peripherals of Painswick, Gloucestershire. The range includes read only, write only and read/write versions that are all based on the Facit 4204 cassette drive.

The CS Series units, which are plug compatible with all forms of paper tape punch/reader, will read or record to ISO 3407/ECMA 34 standard at speeds up to 560 chps.

Digital Peripherals says that the CS units are completely autonomous and require no change to a host computer's software, adding that conversion to the Texas Instruments Silent 700 recording standard is achieved by the operation of a single switch.

Plug in interfaces offered with the CS Series include 8-bit parallel, RS 232 voltage, RS 232 20mA loop, Facit Universal and Facit SP1.

Other CS Series features include automatic error correction and control facilities as standard. Recorded data is validated by block length checks, drop in/drop out detection, timing error detection and cyclic redundancy tests.

Digital Peripherals Ltd (CW), Cheltenham Road, Painswick, Gloucestershire, GL6 6TS. Tel: Gloucester (0452) 812688.

Diagnostic unit

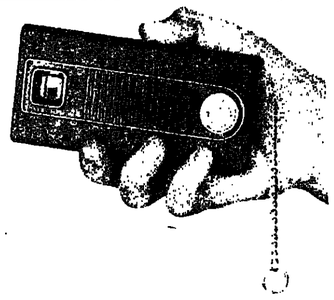
DATA teleprocessing systems can be tested actively and passively with the Digitech Pacer, a portable diagnostic unit from Aspen Electronics Ltd of Eastcote, Middlesex.

As a monitor the Pacer can trap and log specific data sequences, selectively search and retrieve, and record control lead along with data so that complex problems can be isolated rapidly.

In active mode Pacer can test terminals, software, modems, VF lines and the CPU by simulating DTE or DCE, according to Aspen, which also points out that LRC and CRC characters can be generated and checked on command.

Pacer is operated through its integral keyboard using simple commands and output is on a 32-character display. There are also secondary displays and LEDs for showing status, mode and program information. Programs are held in a non-volatile memory and can be edited and deleted at will.

Aspen Electronics Ltd, 3 Kildare Close, Eastcote, Middlesex, HA4 8UW. Tel: 01-868 1188.



A portable alarm that can be fitted to doors and windows has been introduced by Fonadek of Harborne, Birmingham. It can be activated by a quick release chain and measures 5¾ x 2½ x 1 inches. It is of solid state construction and is battery operated.

The price for the door unit (illustrated above) is £13.75. Models with protection for up to five points, including windows, are £14.80 each plus window points at £2.85 per pair. Names of local stockists are available from Fonadek.

Fonadek Ltd (CW), Albany Road, Harborne, Birmingham, B17 9JB. Tel: 021-427 2267.

Ring binder for DP stationery

DESIGNING effective ring binders for computer stationery has always been a complex problem. Small size (¼ inch) marginal sprocket holes dictate the use of fine gauge wires for the mechanism.

The sheer bulk of multi-page print-outs necessitates large rings. Therefore conventional spring action mechanisms of reasonable capacity never work for long because the flimsy wires soon distort and fail to close properly.

Jetleys (Great Britain) has claimed to have solved this problem after 18 months development work. Its solution is the Datajet Speedscrew binder that is based upon a patented screw thread fitting instead of the traditional spring rings.

At its heart is a screw mechanism slim enough to pass the sprocket holes with ease and taking a 2½inch wad of print-out.

This is about three times the capacity of an old-style nominal one-inch ring binder and is held in place, without tearing, by a specially-designed compressor bar.

Binder covers are also available in two standard sizes and special sizes can be made to order.

Jetleys (Great Britain) Ltd (CW), 3-5 Astoria Mansions, Streatham High Road, London SW16 1PS. Tel: 01-677 3823.

In the post

FROM Lamson Paragon is a self-contained mailing system that consists of a pre-sealed envelope containing one or two business forms, plus a separate copy for control purposes.

Known as Speedmailer, more complex constructions incorporating additional parts or a return envelope can be supplied to individual customer's specifications.

In one single operation information printed on the control copy is selectively reproduced on to the envelope and the enclosed forms. But only the required information appears on the envelope, thus ensuring that the communication is confidential.

The system is suitable for computers, small business machines or typewriters.

Lamson Paragon Ltd (CW), Paragon Works, London, E16 1NW. Tel: 01-476 3232.

Service

A SERVICE to tailor mini and microprocessor-based systems to individual requirements is available from Mechtric Engineering.

Services available include system packing and styling, electronic interfacing, special cabinet making, electronic hardware design and manufacturing, system assembly and testing, mechanical design, special panel making and engraving.

Mechtric Engineering Ltd (CW), 12 Brunel Road, Manor Trading Estate, Benfleet, Essex, SS7 4PS. Tel: South Benfleet (0374 5) 59151.

Deleaver

FROM Wilkes-Multimatic is a forms handling machine for the smaller installation. Known as model WMD Mini-deleaver, it removes carbons from multi-part sets and simultaneously separates the forms.

It has most of the features of larger machines, according to Wilkes, including fully adjustable speed controls and takes up 2 x 2 x 2¾ feet of space.

To complete the package, Wilkes have produced a low cost compact, hand-operated burster, named Model WMB. This machine speeds the bursting of continuous forms into single sheets and handles forms three to 12 inches deep and up to 10 inches wide.

Wilkes-Multimatic Ltd (CW), Fairfield Road, Eichfield, Wolverhampton, WV4 5EL. Tel: Bilston (0902) 42981.

UK release for 42 x 60 digitiser

THE Summergraphic's 42 x 60 inch digitiser is now available in the UK from Terminal Display Systems of Blackburn, Lancashire.

Called the ID-60, it is based on the Intel 8080 microprocessor and is the largest in the Summergraphics range, said TDS.

With an accuracy of ±0.004 of one least significant bit, the ID-60 is available OEM and to end-users. TDS added that firmware features for the calculating area and perimeter are offered and skew correction, scaling, mirroring, zooming, windowing and rotation as standard graphic manipulation capabilities.

Interfaces now available include those for RS-232, TTY, Digital Equipment PDP-11s, Data General Novas, Hewlett-Packard HP-9800 series calculators and the IBM 029 keypunch.

Terminal Display Systems Ltd, Hillside, Whitebirk Estate, Blackburn, BB1 5SN. Tel: 0254 662244.

Flooring

A MODULAR raised floor for computer rooms has been introduced by System Floors (UK). The new system incorporates several features which the company claims are unique and which ensure the suitability of the floor for computer installations.

Positive location of the modular panels in to the support pedestals removes the danger of movement and enables each panel to be removed and replaced without difficulty.

The underside and edges of the panels are encased in steel, providing a high degree of fire protection while making the panels strong enough to meet computer manufacturers' load requirements.

The modules each measure 600 x 600 mm and are covered in non-static carpet, vinyl or wood.

System Floors (UK) Ltd (CW), Midland Oak Trading Estate, Marlisa Drive, Lythalls Lane, Coventry CV6 6HQ. Tel: 0203 681436.

Paper binder

FROM Rexel is a paper binder that can hold up to 25 sheets of paper punched with two holes at standard eight centimetre spacing.

Named Sta-Clip, it can be inserted or removed quickly without damage to papers or binder.

The binder can be printed on and is light in weight. Sta-Clips are supplied in boxes of 100 for user convenience and may be obtained from most stationery suppliers who can also supply details of the overprinting service.

Rexel Ltd (CW), Gatehouse Road, Aylesbury, Bucks, HP19 3DT. Tel: 0296 81421.

Printer

INTRODUCING a thermo matrix printer to its range of data products for industrial OEM applications is Facit Addo.

Designated the Facit 4508, it is a lightweight, compact printer that is designed for use with heat-sensitive paper.

It has a full alpha-numeric capability within a 7x5 dot matrix and has a 14 column capacity with print rate of 120 lpm.

Facit-Addo Ltd (CW), Maidstone Road, Rochester, Kent. Tel: Medway (0634) 401721.

Puzzle answer

THE key to the problem lies in finding the first two "moves". These are: 1 make a pair at one end of the row and then 2 make another one-penny in from the other end. The rest is easy.